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CONTENTS.

Steel Trade Improves.....	1551
Iron and Steel in the World's Railroads.....	1552
Rods a Finished Steel Product.....	1553
First Aid a Ground for Damages.....	1553
Lathe or Turning Machines?.....	1553
State Control of Women's and Minors' Wages.....	1554
Koppers Coke Ovens.....	1554
Correspondence	1554
Fuel Efficiency of the Blast Furnace.....	1554
Mechanical Equipment of the Olympic.....	1555
The Accelerated Corrosion Test of Metals.....	1555
British Steel Production in 1910.....	1555
The Size of a Coke Charge for a Cupola.....	1555
The Iron and Metal Markets.....	1556 to 1566
Iron and Industrial Stocks.....	1567
Belgian Iron and Steel Production in 1910.....	1567
Personal	1567
Obituary	1567
Another Ore-Washing Plant in Minnesota.....	1567
Navy Tool Steel.....	1568
Ore Mining on the Great Northern Properties.....	1569
Capabilities of the Molding Machine.....	1569
Operating Costs of Producer Gas Plants.....	1570
Punch with a 48-Lb. Body Casting.....	1571
Jones & Laughlin Sales Department Changes.....	1571
New Type Slow Speed Exhaust Fan.....	1571
A Belt-Driven Flue Sheet Drill.....	1572
New Drive for Planers.....	1573
Boring and Internal Threading Tool.....	1573
Cutting Worm Gear on Gear Hobbing Machine.....	1573
Uehling Waste Meter.....	1574
The Angle Steel Tool Truck.....	1575
A Steel of Great Torsional Strength.....	1575
Air-Cooled Choke Coils.....	1576
Electric Forge Blowers.....	1576
The Cause of the Shelling of Wheel Tires.....	1577
The Baldwin Locomotive Works.....	1577
The Garrigus Surface Grinder.....	1578
A Handy Hydraulic Press.....	1578
Potassium Chromate as Metal Protection Agent.....	1579
New Publications.....	1579
The Townsend High-Speed Drill Press.....	1580
Interesting Application of a Barnes Tapping Machine.....	1580
Reversible Direct-Current Drum Controllers.....	1581
New Magnetic Separator.....	1581
International Harvester Tractor Works.....	1582
A Universal Chain Oil Feed.....	1587
Steam-Hydraulic Forging and Bending Press Catalogue.....	1587
Large Castings in Fast Time.....	1588
Sulphur in the Air and Metal Corrosion.....	1589
Modern Steel Products Warehouse.....	1590
Hill Rail Fastener for Steel Ties.....	1591
Improvement in Feed Water Heating.....	1592
Public Works of Venezuela.....	1593
The Baldwin Strike.....	1593
The Machinery Markets.....	1594 to 1602

Steel Trade Improves

Mill Operations Still Gaining

Pig Iron Trade Slightly More Active

The improvement in the steel trade continues. The volume of business shows a steady gain. This is not due to a spurt in any special branch but to an increase in orders from a multiplicity of sources. The United States Steel Corporation is enlarging the scope of its operations, the active steel ingot capacity this week being over 68 per cent. as against 66 per cent. at the same time last week. The improvement in its operations is more strongly indicated by the statement that at the corresponding time last month the active ingot capacity was only 58 per cent. A considerable part of the recent gain is due to a heavier volume of business at Chicago, where two additional blast furnaces were put in operation in the past week by the Illinois Steel Company to supply needed pig iron.

The improvement is by no means confined to the Chicago district, as Pittsburgh conditions are also better. Bookings in structural shapes and plates are reported to have been much the largest last week in over a year. The billet and rail sales department of the Carnegie Steel Company is over 40,000 tons ahead on actual orders sent to the mills for rolling as compared with the same period in May.

In the structural trade in general, railroad bridge work forms a substantial proportion of the new business coming in the market but some excellent orders have also been booked for other purposes. The American Bridge Company has secured the contract for 8500 tons for the new plant of the Pittsburgh Crucible Steel Company, at Midland, Pa. Orders booked in Eastern territory for buildings, bridges, etc., the past week totaled over 15,000 tons, with quite a number of orders pending. This branch of business seems to be close to normal conditions. It had been hoped that by this time the New York City Subway question would be definitely settled and that the trade could look forward with some certainty to the enormous requirements for steel which the new subways will call for. It seems, however, that some further time must elapse until it is known when the work will actually begin.

While the plate-trade shows some increase, indications of an early heavy demand are seen in the increasing number of inquiries coming out for steel cars.

The change in the condition of the sheet trade is one of the interesting developments of the month. From the time prices were reduced the demand has improved, and current reports of business are very satisfactory. Some large manufacturers are now running all their mills on full time, whereas in the early part of May their operations were intermittent,

The better feeling in this branch of business has caused important contracts for sheet bars to be placed in Pittsburgh the past week for future delivery.

While the situation in finished lines is thus showing decidedly improved conditions, the feeling of optimism is somewhat tempered by the knowledge that a great deal of slack still remains to be taken up to put the steel plants of the country in really good working shape.

Reports from the various pig iron markets are better, as orders are more numerous and inquiries are more plentiful. No general buying movement has yet set in, but the number of consumers who feel that the present is a good time to purchase is steadily growing larger. Prices of pig iron are no firmer as many makers are anxious to get their share of such business as is now coming out.

The export trade is fairly active, with moderate orders being received for rails, track supplies, locomotives and other railroad material from South and Central America. Canada has placed further contracts for material needed by agricultural implement manufacturers and large inquiries are being received for other classes of products from Canadian buyers.

The coke market is showing much greater activity as quite a number of pig iron manufacturers are now placing contracts for their requirements for the last half of the year, while large consumers of foundry coke are also making contracts for their supplies.

The Amalgamated Association and the Republic Iron & Steel Company have settled upon the wage scale for bar iron mills for the twelve months from July 1. The scale is the same as for the current year except for some slight changes in foot notes.

Iron and Steel in the World's Railroads

The statistics of the world's railroad mileage at the close of 1909, compiled by the Archiv für Eisenbahnenwesen and recently published, deserve some study and comparison with previous returns. The world's railroad mileage at the close of each of the past six years and the increase during the year have been as follows:

	Total at close.	Increase in year.
1904	550,290	.....
1905	562,783	12,493
1906	580,276	17,493
1907	594,867	14,591
1908	611,554	16,687
1909	625,698	14,144

Poor's mileage statistics for the United States alone for the same years are as follows:

	Total at close.	Increase in year.
1904	212,394	5,059
1905	217,341	4,947
1906	222,766	5,425
1907	228,128	5,362
1908	232,046	3,918
1909	238,356	6,310

The United States increase of 6310 miles shown for 1909 was not all attributable to that year, there being 2923 miles represented by remeasurements, small roads reporting for the first time, etc., so that for comparative purposes, there should be taken 3387 miles as the 1909 increase.

Figuring the increase each year as a percentage of the mileage at the opening of that year, the results come out as follows, for the United States alone and for the world exclusive of the United States:

	United States.	Remainder of world.
1905	2.32	2.24
1906	2.50	2.50
1907	2.41	2.58
1908	1.72	3.48
1909	1.46	2.84

The rate of increase in the United States sensibly declined after 1906, whereas the increase in the remainder of the world, while varying, did not show any material change, and it may be taken that the world's railroad mileage outside of the United States, amounting to 380,000 miles at the close of 1909, is increasing at the rate of 3 per cent. a year. This rate is equivalent to a doubling in 23 years. The average rate of increase shown by the United States in 1908 and 1909 was 1.6 per cent., which would involve a doubling in 44 years.

The statistics of our German contemporary are presented by continents. The totals for its geographical divisions at the close of 1909, and the increases during the four years ending with 1909, are as shown below, and we have computed in each case the percentage of the mileage at the close of 1909 which was added in the four years:

	At close of 1909.	Increase four years.	Percent. increase of total.
Europe	204,904	12,359	6.0
Asia	61,800	11,197	18.2
Africa	20,809	4,518	21.8
North America	277,015	25,057	9.0
South America	42,329	8,273	19.6
Australasia	18,849	1,396	7.4

It is readily observed that the well-developed continents, Europe and North America, have added the least proportionate to their mileage, while the less-developed continents, Asia, Africa and South America, have added mileage in much greater ratio, although the number of miles added has been smaller. This is what would be expected.

An interesting question is the tonnage of iron and steel used in railroad construction in the world. No accurate estimate can be made, for the reason that conditions vary so widely with different railroads according to the character and density of traffic. In the Cape to Cairo project, for instance, a single track line is amply sufficient, and the rolling stock per mile of line is necessarily light. So it was originally with our own transcontinental lines. On the other hand, in the eastern part of this country we have four-track roads with many cars and locomotives per mile of road, and a similar condition prevails in England. For a rough estimate of the world, however, the proportions obtaining in the United States might not prove to be far wrong. They are substantially as follows, per mile of line: Miles of track, 1.4; locomotives, 0.25; cars, 9.4.

On the basis of these data, it may be estimated roughly that in the United States there are tied up in the railroads the following tonnages of iron and steel: Rails, 45,000,000 tons; bridges, buildings, etc., 10,000,000 tons; locomotives, 5,000,000 tons; cars, 25,000,000 tons; total, 85,000,000 tons. For the remainder of the world, allowing for the lesser use of steel cars and steel bridge material, a rough estimate would be: Rails, 70,000,000 tons; bridges, buildings, etc., 10,000,000 tons; locomotives, 10,000,000 tons; cars, 25,000,000 tons; total, 115,000,000 tons. This would make a grand total of about 200,000,000 tons of iron and steel tied up in the railroads of the world, exclusive, of course, of electric and minor systems. The world's annual production of pig iron has lately increased to 60,000,000 tons, having been 40,000,000 tons in 1900. Evidently a large proportion of the production has gone into railroads, but the railroad consumption has not been of overshadowing proportions, as is occasionally assumed.

Rods a Finished Steel Product

The incident that wire rods were reduced \$2 a ton in price at the time of the reduction in wire prices, June 20, instead of at the time billets were reduced, May 29, is not without its significance. In the old days wire rods were regarded as a semifinished product, and took their place with billets and sheet bars. They were often bought for drawing into wire and were therefore to be regarded as more or less cognate with billets, which were bought to roll into merchant bars, etc., and with sheet bars, which were bought to roll into sheets and tin plates. Of late there has been relatively little tonnage of rods which has changed ownership to be subsequently drawn into wire. On the other hand, the tonnage of rods used for other purposes, particularly for making chain, has greatly increased.

The line between the steel industry proper, which makes rolled steel products, and the fabricating trade, which works these products up in various ways for ultimate utilization, is now more properly drawn simply to include rods as a material to pass from the one class to the other, rather than in a way to include rods as contained within the steel industry. In a sense, the rod is one of the finished products of the ordinary wire mill, to be sold to those who use it for other purposes than drawing into wire. Years ago, on the other hand, rods could often be classified as the raw material of the ordinary wire mill. The practice of buying billets to roll into rods to be drawn into wire still survives to a limited extent, but there are a very few instances. Ordinarily the producer of the wire makes even the steel ingot.

First Aid a Ground for Damages

The Supreme Court of New Jersey has handed down a decision in which a manufacturer is found liable for the negligence of his superintendent in connection with the dressing of a wound received by a workman. The man had cut his finger with a pair of scissors, and the superintendent instructed another employee to dress the injured member. Carbolic acid was applied and gangrene followed, which made necessary the amputation of the finger. The injured man sued for damages and a verdict was awarded him. The employer appealed the case to the higher court, the question involved being whether the use of medicine found in an emergency chest in the factory was within the authority given by the superintendent to the man who dressed the injury. The court says that it was.

The decision gives employers ground for serious reflection. Various States have enacted statutes compelling manufacturers to maintain kits for first aid to the injured. This, of course, implies that the contents of the kits shall be used in case of accident. If the treatment is unskillful the owner, under this decision, may be liable for damages. Therefore, the employer is wise who selects with a good deal of care the person to whom the emergency treatment shall be intrusted. Referring to the case in question, carbolic acid, properly diluted, would generally be considered a proper antiseptic agent. Treatment given by a surgeon may not rid a wound of the danger of blood-poisoning. The law says, in some States, that the emergency chest shall be available for immediate use, the natural deduction being that first aid must be administered. A contradictory situation is thus created by the statutes. Logically considered, if the employer does his best for his injured workmen, his duty would seem to have

been performed. Of course, a case may be imagined where the misuse of the contents of the kit would be so monstrous, through ignorance, as to savor of criminal negligence. But, generally speaking, the injured workman should be considered as having the advantage of the very essential immediate treatment. If serious results follow, it would seem that the employer should not be held by statute as liable.

Whatever the rights and wrongs of these legal conditions, it is clearly desirable for an owner to give the subject of emergency treatment attention. A common practice is to select for the duty one or two men of sufficient intelligence to enable them to learn the necessary elementary principles of surgery. A physician may be employed to instruct them. If this work is not systematized, if any workman who happens to be available is permitted to treat an injury sustained by one of his fellows, the chances of inefficiency are multiplied.

Lathe or Turning Machine?

The discussion which promises to develop into a controversy among machine tool manufacturers as to whether a lathe should be called a turning machine seems to be a matter properly fit for "dog days" contemplation. As yet, it would appear that it has not been submitted to the proper authorities for settlement. The old saw that "a rose by any other name would smell as sweet" does not apply here, for a turning machine announcement in an advertisement or catalogue might not meet with the proper attention from a prospective lathe purchaser; hence, it would not seem that a lathe by any other name would sell as well.

If apprentices and prospective engineers are taught that a certain device is called a lathe it will require some education to sell them turning machines for lathe work when they become the buying men. So the question "what's in a name?" is worthy of some consideration in this event at least. The argument that the word lathe does not mean anything may have some foundation now, but time was when, in a measure, it described an important principle of the machine. A "lath" or flexible pole was an important part of the first self-contained machine, as witness the following extract from "Modern American Lathe Practice," by Oscar E. Perrigo, M.E.:

A piece of wood formed a bed for the lathe, and to this was fixed the blocks forming the centers, which have since become the head and tail stocks of the lathe. The machine appears to have been used indoors, as the flexible limb of the tree had been replaced by a flexible strip or pole, "fastened overhead" and called a "lath," from which circumstance some writers think that the name "lathe" was derived. The driving cord was still wound around the piece to be turned. No mention is made of the method of supporting the tool, but it is probable that a strip of wood was fastened to the "bed" for that purpose.

It is not our purpose to discourage any reform that makes for a better standardization of machine tools, but if a lathe is to be called a turning machine what about a boring mill, which also turns parts? Certainly a manufacturer has the privilege of calling his product what he will, but, for selling reasons alone, the makers of lathes or turning machines, or whatever they may be, would do well to get the co-operation of the instructors of technical schools and colleges in making a change, so that the literature now being studied by future buyers can be reformed as a first step.

State Control of Women's and Minors' Wages

Massachusetts has established a commission whose duty will be to study the matter of wages of women and minors. Later, to quote the legislative act, "It will report on the advisability of establishing a board or boards to which shall be referred inquiries as to the need and feasibility of fixing minimum rates of wages for women and minors in any industry." The plan is that next year's Legislature will pass upon bills submitted by this commission. The body as proposed is to consist of five persons, including a woman, a representative of labor and a representative of employers.

The idea of a minimum wage board is not new. As an advisory board it may perform a useful work, but it is difficult to understand how such a tribunal could be vested with power to determine the wage that must be paid by an employer to an employee. A State may have the power to define the maximum number of hours for which a woman or a child may be employed during the week, but we very much doubt if the State can tell an employer that he shall pay a given wage to these people. In some industries women and children are sadly underpaid. In the metal trades this charge is seldom heard; in other trades the condition is notorious. If a State could establish a board consisting of intelligent persons having an intimate understanding of business conditions, the moral influence might be very important. Probably everything would depend upon the personality of the members.

Industry is progressing along this line of its own volition. Hygiene is more and more recognized as a factor of costs. Employers desire their working people to be in good health, and, as far as possible, in good spirits. They believe in paying a living wage. In the metal industry the average wage of women and children is, undoubtedly, greater than that in the mercantile world. It is not alone the influence of supply and demand which regulates these matters. Probably a very great number of manufacturers will be glad to learn the results of this investigation of the Massachusetts commission.

Koppers Coke Ovens

H. Koppers, Joliet, Ill., calls attention to the fact that the article on "By-Product Coke Ovens in America," which was published in *The Iron Age* of June 8, omitted to state that the list of ovens given was for the year 1909. For this reason an apparent injustice was done to the Koppers oven. In addition to the Koppers ovens mentioned in the article, 110 have been installed at Sault Ste. Marie, Ontario, Canada, 60 at Woodward, Ala., and 86 waste heat ovens in Mexico, while other Koppers plants under construction comprise 420 ovens for the Indiana Steel Company (United States Steel Corporation) at Gary, Ind., 280 ovens for the Tennessee Coal, Iron & Railroad Company (United States Steel Corporation) at Corey, Ala. A recent contract has further been made for 35 Koppers ovens with the Coal Products Mfg. Company, Joliet, Ill.

The T. A. Gillespie Company, Pittsburgh, has been awarded by the Board of Water Supply of New York City a contract for the construction of a portion of the Hudson River division of the Catskill aqueduct in the towns of Cornwall and Fishkill. Its bid was \$1,649,020 and was the third lowest, but, by reason of the importance of the undertaking, the board decided to make the award to the Gillespie Company because of its facilities, experience and resources. The steel requirements of the complete portion of the Catskill aqueduct from Yonkers, N. Y., to Brooklyn, amounting to about 6000 tons, will be rolled by the Carnegie Steel Company, Pittsburgh.

Correspondence

Protecting Metal from Superincumbent Slag

To the Editor: In rather tardily looking over your issue of June 1, reporting the proceedings of the convention of the American Foundrymen's Association recently held in Pittsburgh, I note I have been incorrectly quoted on page 1330 as follows: "He mentioned that the deleterious effect of slag resting on the metal was met by the use of thermit with silicon." I distinctly made a statement to the contrary. In the discussion following the paper which I read, Professor Stoughton asked if the addition of thermit and silicon to the last part of the heat in the ladle would not overcome the difficulty experienced by deterioration of the metal lying just beneath the slag. I replied that this did not entirely overcome the difficulty, since raising the temperature and the silicon content were not in themselves sufficient, as the manganese and sulphur are affected by the slag.

R. A. BULL,
Commonwealth Steel Company.

GRANITE CITY, ILL., June 14.

Fuel Efficiency of the Blast Furnace

Under the title, "The Fuel Efficiency of the Iron Blast Furnace," John Jermain Porter, Cincinnati, Ohio, contributed a paper to the Wilkes-Barre meeting of the American Institute of Mining Engineers, analyzing the heat changes occurring in the blast furnaces. In this paper he asserts that the activities of furnace managers are limited to the more perfect cultivation of the fields already open, and that there is no new ground to be broken until commercially feasible methods of producing high-oxygen blasts are at hand. There is no question, he continued, that the furnacemen of the future will have to meet the condition of smelting very lean ores. With the high slag volume then produced, the carbon requirements of the hearth will become more than ever the controlling factor, and the heat requirements in the stack may, for all practical purposes, be ignored.

With regard to blast temperature, he emphasizes that when using Mesaba ores, the temperature is limited by the tendency of the furnace to stick and hang at high heats. His observations, however, cover results in which 1100 deg. F. blast temperature is used in connection with 70 per cent. Mesaba ore.

In respect to the carbon loss in the shaft of the furnace, it is thought that current furnace practice is, as a rule, fairly satisfactory, with the exception that in the Southern districts the ore and limestone are generally insufficiently crushed and sized previous to charging. He believes that in a number of cases it would be possible to save at least 100 lb. of fuel per ton of iron by better practice in this regard. Fineness beyond a certain point is, of course, undesirable, as it induces excessive carbon-deposition and causes hanging of the furnace. Ores reduced with difficulty do not cause this trouble, he mentions, and fuel may be saved by having them finely crushed as is compatible with a reasonably low loss in flue dust.

In regard to the attempt to reduce the cost of making pig iron, the author expresses a belief that a simultaneous study of the possibility of metallurgical improvement and of the cost sheet will show in many cases far greater returns than could have been obtained through judicious expenditure looking toward the reduction of fuel through an increase in available heat than through the development of labor-saving machinery, such as skip hoists, casting machines, pig breakers and the like, the value of which he does not question. In short, he feels that most furnacemen have placed too much emphasis upon mechanical effect of these improvements on the cost sheet.

The following table on cost is of probable interest:

Approximate Percentage of the Items Entering into the Cost of Making Pig Iron.					
	Alabama.	Virginia.	Pittsburgh.	Chicago.	Atlantic Coast.
Ore	35	38	70	54	43
Flux	1	7	2	2	5
Fuel	47	39	18	34	40
Labor	10	11	6	6	8
Supplies and repairs	7	5	4	4	4
Total	100	100	100	100	100

Mechanical Equipment of the Olympic

The mechanical equipment on the new steamship Olympic of the White Star Line, which ended its initial voyage at New York June 21, requires the attendance of a corps of men sufficient to operate a good-sized manufacturing plant. Counting the firemen and stokers, there are 230 men in the engineering department, and 40 of these are designated as engineers. The vessel, which is the largest now afloat, is the first transatlantic liner to be equipped with both reciprocating and turbine engines. There are two reciprocating engines of the four-cylinder triple-expansion type, taking steam at 250 lb. to the sq. in. and operating at about 75 r.p.m., and one auxiliary steam turbine of the Parsons type which is designed to take steam from the reciprocating engines at about 9 lb. absolute, expanding down to 1 lb., and is capable of running at 165 r.p.m.

The boat carries a refrigeration plant consisting of two horizontal duplex carbonic acid machines. The electric plant consists of four 400-kw generators, each directly coupled to a 580-hp. vertical 3-crank compound engine running at 325 r.p.m. The steam generating plant comprises 29 boilers, 20 of which are double ended and are 20 ft. long by 9 ft. 9 in. in diameter, and five are single ended boilers, 11 ft. 9 in. long and 15 ft. 9 in. in diameter. The latter are arranged so as to be available for the auxiliary machinery while the ship is in port. To take care of the repairs on this equipment a machine shop has been installed on board, which has a complete line of machine tools required in tool making and for making machine parts. Three machinists are regularly employed in this shop, and in case of necessity other men in the engineering department can be detailed to machine-shop work.

The Accelerated Corrosion Test of Metals

R. C. McBride, Commercial Chemical Laboratory, Youngstown, Ohio, writes to the Engineering Record, New York, as follows regarding some analyses and tests made for the purpose of investigating the value of the accelerated corrosion test as an indication of the ability of metal to resist the action of the weather:

The first sample examined was a piece of sheet-iron roofing which was known to have been in service for more than 40 years, and in that time to have received but two coats of paint. Here was a chance to make an accelerated test on a sample which had already demonstrated its ability to resist the conditions of actual service. A carefully cleaned piece was submitted to the action of 2½ per cent. sulphuric acid at room temperature for 24 hr. To our surprise the sample showed a loss of 71 per cent. in weight. The analysis of this sample was: Slag, 80 per cent.; sulphur, 0.057; phosphorus, 0.157; manganese, none. This analysis shows it to have been the real old puddled iron.

At the end of the accelerated test the iron presented a very marked foliated structure which, viewed edgewise, resembled a stone wall from which all the cement had been removed. This peculiar appearance at once suggested that the slag had been attacked and dissolved out more readily than the iron. Analysis showed this to have been the case, as the sample contained only 0.20 per cent. slag after it had been subjected to the action of the acid. This seems to support the old theory that the weather-resisting power of puddled iron was largely due to the protective action of inclosing layers of slag, this protective action being in addition to the more recently discovered protection afforded by absence of manganese, while the greater susceptibility of this iron to accelerated corrosion is due to the fact that the dilute acid employed readily attacks this protective coating and, by opening up the foliated structure, in this way multiplies the surface exposed to corrosive action. It is well known that slag resists, almost to the point of immunity, the corrosive agents of actual service.

A sample of new sheet iron submitted by a company which claims its product to be the "old fashioned" puddled iron showed a loss of 17.7 per cent. under the accelerated test. The analysis of this sample was: Slag, 1 per cent.; sulphur, 0.011; phosphorus, 0.012; manganese, none. Judged by the electrolytic theory alone, this sample would be very highly resistant to corrosion, and

in our opinion would be, were it not for the opening offered by the dissolving away of the inclosed slag, for its analysis is much better than that of the 40-year-old sample, as also is its corrosion figure.

That the absence of slag in the presence of manganese does not imply resistance to accelerated corrosion, any more than does the absence of manganese in the presence of slag, is proved by the high accelerated corrosion figures of ordinary Bessemer steel. One sample of this material tested had the following analysis: Slag, none; sulphur, 0.075 per cent.; phosphorus, 0.133; manganese, 0.41. This showed a loss of 31.6 per cent. by the accelerated test.

These experiments would seem to lead to the following conclusions: As a means of comparing the weather-resisting abilities of steels or so-called irons which have been rolled from molten ingots in which no slag is found, the accelerated corrosion test may be of value; but since irons which have successfully resisted the weather for "10, these 40 years" are torn wide open by this test, we must conclude that their slag content, while a protection in actual service, entirely vitiates the accelerated test as applied to such materials.

British Steel Production in 1910

The British Iron Trade Association, through its secretary, Fairfax Scott, has published the statistics of the production of steel in the United Kingdom in 1910, from which are compiled the following details: Bessemer ingots, 1,779,115 gross tons; open-hearth ingots, 4,231,569 tons. In 1909 the production was: Bessemer ingots, 1,733,220 tons; open-hearth ingots, 4,148,408 tons. Of the Bessemer ingot production in 1910 1,138,103 tons were acid and 641,012 tons were basic. The production of basic open-hearth ingots in 1910 was 1,578,536 tons, and of acid open-hearth ingots, 2,653,033 tons. The production of crucible steel and steel castings is not given. The production of Bessemer steel rails, including ties and fish-plates, in the United Kingdom in 1910 was 711,915 tons, as compared with 821,079 tons in 1909, being a decrease of 109,164 tons, and less than the output of 1908, the year of depressed trade.

The Size of a Coke Charge for a Cupola.—A charge of coke in the cupola may be called a small or suitable charge when it is below 200 lb. per square foot of the cross-sectional area of the cupola, and it may be considered a large charge when it is above this amount. P. Munnoch drew this line in a paper on cupola melting practice in Great Britain presented to the recent Pittsburgh meeting of the American Foundrymen's Association. In addition, he mentioned that the lower the melting ratio and the lower the density of the coke the smaller is the charge desirable. Sometimes, therefore, 100 lb. per square foot sectional area might be ample. The area of the cross-section multiplied by 2½ and the result multiplied by 60 (minutes) gives ideal coke consumption per hour. This multiplied by 10 gives the ideal rate of melting in pounds of iron per hour. Figures thus found are useful to compare with the actual melting rate.

The National Commissary Managers' Association will hold its annual meeting in St. Louis, Mo., August 22 to 24. The headquarters will be at the Southern Hotel. B. M. Leiby, Dutton, Florida, is president of the association, and Tracy D. Luccock, 801 Manhattan Building, Chicago, is secretary and treasurer. This association is composed of managers of stores conducted by coal mining companies, lumber manufacturers, cotton manufacturers, etc. Special addresses are to be made by men of national reputation on subjects of vital importance to the commissary trade.

A rotary steam engine, which has been tested in use at the Aurora Cotton Mills at Burlington, N. C., and the Agricultural and Mechanical College at Raleigh, N. C., is to be manufactured on a commercial basis by the Holt Engine Company, Burlington, N. C. Tests are reported in which an 8-hp. engine developed 10 hp. at 400 r.p.m. with 100 lb. steam pressure with a consumption of 33 lb. of steam per horse-power per hour and developed 7.95 hp. at 300 r.p.m. and 100 lb. steam pressure with a consumption of 40 lb. per horse-power-hour.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	June 28 1911.	June 21 1911.	May 30 1911.	June 29 1910.
PIG IRON, Per Gross Ton:				
Foundry No. 2, standard, Philadelphia.....	\$15.00	\$15.00	\$15.50	\$16.25
Foundry No. 2 Valley furnace..	13.50	13.50	13.75	14.50
Foundry No. 2, Southern, Cincinnati.....	13.25	13.25	13.75	14.75
Foundry No. 2, Birmingham, Ala.	10.00	10.00	10.50	11.50
Foundry No. 2 local, at furnace, Chicago.....	15.00	15.00	15.00	16.75
Basic, delivered, eastern Pa....	14.50	14.50	14.50	15.75
Basic, Valley furnace.....	13.00	13.00	13.10	14.50
Bessemer, Pittsburgh.....	15.90	15.90	15.90	16.40
Gray forge, Pittsburgh.....	13.90	13.90	14.15	14.90
Lake Superior charcoal, Chicago	16.50	16.50	17.00	18.50

COKE, CONNELLSVILLE,

Per Net Ton, at oven:				
Furnace coke, prompt shipment	1.40	1.40	1.45	1.65
Furnace coke, future delivery..	1.60	1.60	1.75	1.80
Foundry coke, prompt shipment	1.80	1.75	1.75	2.15
Foundry coke, future delivery..	2.10	2.05	2.00	2.25

BILLETS, &c., Per Gross Ton:

Bessemer billets, Pittsburgh....	21.00	21.00	21.00	25.00
Forging billets, Pittsburgh.....	26.00	26.00	26.00	31.00
Open hearth billets, Philadelphia	23.40	23.40	23.40	28.50
Wire rods, Pittsburgh.....	27.00	27.00	29.00	31.00

OLD MATERIAL, Per Gross Ton:

Iron rails, Chicago.....	14.00	14.00	14.50	17.00
Iron rails, Philadelphia.....	16.50	16.50	16.75	19.50
Car wheels, Chicago.....	12.50	12.50	12.75	15.50
Car wheels, Philadelphia.....	13.00	13.00	13.00	14.50
Heavy steel scrap, Pittsburgh..	13.00	13.00	13.00	15.00
Heavy steel scrap, Chicago.....	10.25	10.25	10.25	12.75
Heavy steel scrap, Philadelphia..	13.00	13.00	13.00	14.25

FINISHED IRON AND STEEL.

Per Pound:	Cents.	Cents.	Cents.	Cents.
Bessemer rails, heavy, at mill..	1.25	1.25	1.25	1.25
Refined iron bars, Philadelphia..	1.27½	1.27½	1.27	1.47½
Common iron bars, Pittsburgh..	1.25	1.25	1.25	1.50
Common iron bars, Chicago.....	1.20	1.20	1.20	1.45
Steel bars, Pittsburgh.....	1.25	1.25	1.25	1.45
Steel bars, tidewater, New York	1.41	1.41	1.41	1.61
Tank plates, Pittsburgh.....	1.35	1.35	1.35	1.45
Tank plates, tidewater, New York	1.51	1.51	1.51	1.61
Beams, Pittsburgh.....	1.35	1.35	1.35	1.45
Beams, tidewater, New York..	1.51	1.51	1.51	1.61
Angles, Pittsburgh.....	1.35	1.35	1.35	1.45
Angles, tidewater, New York..	1.51	1.51	1.51	1.61
Skelp, grooved steel, Pittsburgh	1.25	1.25	1.30	1.50
Skelp, sheared steel, Pittsburgh	1.35	1.35	1.35	1.60

SHEETS, NAILS AND WIRE,

Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.00	2.00	2.00	2.40
Wire nails, Pittsburgh.....	1.70	1.70	1.80	1.80
Cut nails, Pittsburgh.....	1.60	1.60	1.60	1.75
Barb wire, galv., Pittsburgh..	2.00	2.00	2.10	2.10

METALS,

Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.....	12.87½	12.75	12.45	12.75
Electrolytic copper, New York..	12.62½	12.50	12.25	12.37½
Spelter, St. Louis.....	5.45	5.55	5.20	5.05
Spelter, New York.....	5.65	5.75	5.50	5.20
Lead, St. Louis.....	4.35	4.35	4.22½	4.22½
Lead, New York.....	4.50	4.50	4.37½	4.37½
Tin, New York.....	45.00	44.87½	45.50	33.00
Antimony, Hallett, New York..	8.25	8.75	8.95	8.12½
Tin plate, 100-lb. box, New York	\$3.94	\$3.94	\$3.94	\$3.84

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton

†These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought boiler tubes.

Structural Material.—I-beams and channels, 3 to 15 in., inclusive, 1.35c. to 1.40c., net; I-beams over 15 in., 1.45c. to 1.50c., net; H-beams over 8 in., 1.50c. to 1.55c.,

angles, 3 to 6 in., inclusive, ¼ in. and up, 1.35c. to 1.40c., net; angles over 6 in., 1.45c. to 1.50c., net; angles, 3 in. on one or both legs, less than ¼ in. thick, 1.40c., plus full extras as per steel bar card effective September 1, 1909; tees, 3 in. and up, 1.40c., net; zeos, 3 in. and up, 1.35c. to 1.40c., net; angles, channels and tees under 3 in., 1.40c., base, plus full extras as per steel bar card of September 1, 1909; deck beams and bulb angles, 1.65c. to 1.70c., net; hand rail tees, 2.45c.; checkered and corrugated plates, 2.45c., net.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.35c. to 1.40c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot, are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼-in. to and including 3-16-in. on thinnest edge, extra.....	\$0.10
Gauges under 3-16-in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
Gauges under No. 9 to and including No. 10.....	.30
Gauges under No. 10 to and including No. 12.....	.40
Sketches (including all straight taper plates) 3 ft. and over in length.....	.10
Complete circles, 3 ft. in diameter and over.....	.20
Boiler and flange steel.....	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel.....	.30
Marine steel.....	.40
Locomotive firebox steel.....	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.....	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft. inclusive.....	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive.....	.50
Cutting to lengths or diameters under 1 ft.....	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

TERMS—Net cash 30 days.

Sheets.—Makers' prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual discounts for small lots from store, are as follows: Blue annealed sheets, Nos. 3 to 8, U. S. standard gauge, 1.40c.; Nos. 9 and 10, 1.50c.; Nos. 11 and 12, 1.55c.; Nos. 13 and 14, 1.60c.; Nos. 15 and 16, 1.70c. One pass, cold rolled, box annealed sheets, Nos. 10 to 12, 1.65c.; Nos. 13 and 14, 1.70c.; Nos. 15 and 16, 1.75c.; Nos. 17 to 21, 1.80c.; Nos. 22, 23 and 24, 1.85c.; Nos. 25 and 26, 1.90c.; No. 27, 1.95c.; No. 28, 2c.; No. 29, 2.05c.; No. 30, 2.15c. Three pass, cold rolled sheets, box annealed, are as follows: Nos. 15 and 16, 1.85c.; Nos. 17 to 21, 1.90c.; Nos. 22 to 24, 1.95c.; Nos. 25 and 26, 2c.; No. 27, 2.05c.; No. 28, 2.10c.; No. 29, 2.15c.; No. 30, 2.25c. Galvanized sheets, Nos. 10 and 11, black sheet gauge, 2c.; Nos. 12, 13 and 14, 2.10c.; Nos. 15, 16 and 17, 2.25c.; Nos. 18 to 22, 2.40c.; Nos. 23 and 24, 2.50c.; Nos. 25 and 26, 2.70c.; No. 27, 2.85c.; No. 28, 3c.; No. 29, 3.10c.; No. 30, 3.30c. All above prices are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount 10 days from date of invoice, as also are the following base prices per square for painted and galvanized roofing sheets, with 2½-in. corrugations:

Gauge.	Painted.	Galvanized.	Gauge.	Painted.	Galvanized.
29	....	\$2.40	23	\$2.40	\$3.50
28	\$1.40	2.55	22	2.60	3.70
27	1.55	2.60	21	2.80	4.05
26	1.65	2.65	20	3.05	4.35
25	1.85	3.05	18	4.05	5.70
24	2.10	3.15	16	4.90	6.50

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from October 1:

	Butt Weld.		Steel.		Iron.	
	Black.	Galv.	Black.	Galv.	Black.	Galv.
1 to 1½ in.....	75	63	49	43		
1½ in.....	75	63	71	59		
¾ to 1½ in.....	79	69	75	65		
2 to 3 in.....	80	70	76	66		
Lap Weld.						
2 in.....	76	66	72	62		
2½ to 4 in.....	78	67	74	64		
4½ to 6 in.....	77	67	73	63		
7 to 12 in.....	75	59	71	55		
13 to 15 in.....	15½	..	..	..

THE IRON AND METAL MARKETS

Butt Weld, extra strong, plain ends, card weight.

1/2, 3/4, 1 in.	69	59	65	55
1 1/2 in.	74	68	70	64
3/4 to 1 1/2 in.	78	72	74	68
2 to 3 in.	79	73	75	69

Lap Weld, extra strong, plain ends, card weight.

2 in.	75	69	71	65
2 1/2 to 4 in.	77	71	73	67
4 1/2 to 6 in.	76	70	72	66
7 to 8 in.	69	59	65	55
9 to 12 in.	64	54	60	50

Butt Weld, double extra strong, plain ends, card weight.

1/2 in.	64	58	60	54
3/4 to 1 1/2 in.	67	61	63	57
2 to 3 in.	69	63	65	59

Lap Weld, double extra strong, plain ends, card weight.

2 in.	65	59	61	55
2 1/2 to 4 in.	67	61	63	57
4 1/2 to 6 in.	66	60	62	56
7 to 8 in.	59	49	55	45

Plugged and Reamed.

1 to 1 1/2, 2 to 3 in. Butt Weld	Will be sold at two (2) points lower basing (higher price) than merchants or card weight pipe. Butt or lap weld, as specified.
2, 2 1/2 to 4 in. Lap Weld	

The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lower basing (higher price) than the above discounts.

Boiler Tubes.—Discounts on lap welded steel boiler tubes to jobbers in carloads are now as follows:

1 1/4 to 2 1/4 in.	Steel.
2 1/2 in.	65
2 3/4 to 3 1/4 in.	67 1/2
3 1/2 to 4 1/2 in.	70
5 to 6 in.	72 1/2
7 to 13 in.	65
	62 1/2

Less than carloads to destination east of the Mississippi River will be sold at delivered discounts for carloads lowered by two points for lengths 22 feet and under; longer lengths f.o.b. Pittsburgh. Usual extras to jobbers and boiler manufacturers.

Wire Rods and Wire.—Bessemer, open hearth and chain rods, \$27. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days, or 2 per cent. discount in 10 days, carload lots, to jobbers, annealed, \$1.50, galvanized \$1.80; carload lots, to retailers, annealed \$1.55, galvanized \$1.85. Galvanized barb wire, to jobbers, \$2; painted, \$1.70. Wire nails, to jobbers, \$1.70.

The following table gives the prices to retail merchants on wire in less than carloads, including the extras on Nos. 10 to 16, which are added to the base price:

No.	0 to 9	10	11	12 & 12 1/2	13	14	15	16
Annealed	\$1.65	1.70	1.75	1.80	1.90	2.00	2.10	2.20
Galvanized	1.95	2.00	2.05	2.10	2.20	2.30	2.70	2.80

Market and Stone Wire in Bundles, Discount from Standard List.

Bright and Annealed:	
9 and coarser	80
10 to 18	80 and 10
19 to 26	80 and 10 and 2 1/2
27 to 36	80 and 5

Galvanized:	
9 and coarser	75 and 10
10 to 16	75 and 10
17 to 26	72 1/2 and 10
27 to 36	72 1/2

Coppered or Liquor Finished:	
9 and coarser	75 and 10
10 to 26	75 and 10
27 to 36	70 and 10 and 5

Tinned:	
6 to 18	75 and 10 and 10

Pittsburgh

PARK BUILDING, June 28, 1911.—(By Telephone.)

Pig Iron.—New inquiries are more numerous and some tonnage in basic and foundry iron has been closed. A local steel casting company has bought 250 tons of Bessemer iron for July shipment at less than \$14.90, Pittsburgh, the sale having been made by a dealer. All the Valley furnaces are quoting \$15 on Bessemer, but middlemen are naming \$14.75 to \$14.90 and are taking what little business is being offered. A radiator company at Johnstown, Pa., has bought 600 tons of No. 2 foundry from a nearby furnace and another radiator company in the same city is expected to close this week for about 3000 tons of No. 2 foundry for last half delivery. A large tonnage of basic and foundry iron is under negotiation. Prices on Bessemer iron are weak and \$15, Valley, would be shaded on a firm offer and for large tonnage. We quote as follows: Bessemer pig iron, nominally, \$15; malleable Bessemer, \$13.50; basic, \$13; No. 2 foundry, \$13.50 to \$13.75; gray forge, \$13, all at Valley furnace, the freight rate to Pittsburgh being 90c. per ton.

Steel.—Specifications against contracts for sheet bars from the independent sheet mills have been better in

the past week, owing to the heavier demand for sheets, and a number of contracts for sheet bars and tin bars for the third quarter have been placed at the regular price of \$22, Pittsburgh. A sale of 500 tons of forging billets for July delivery is reported at \$26, delivered at buyer's mill, Pittsburgh. We quote Bessemer and open hearth billets, 4 x 4 in., and up to but not including 10 x 10 in., \$21, base, and sheet and tin bars in 30-ft. lengths, \$22; 1 1/2-in. billets, \$22; forging billets, \$26, base, usual extras for sizes and carbons—all prices being f.o.b. Pittsburgh or Youngstown district, with freight to destination added.

(By Mail)

The improvement in trade continues and conditions are undoubtedly better to-day in point of actual orders being sent to the mills for rolling than they have been in some months. The billet and rail sales department of the Carnegie Steel Company is 40,000 tons or more ahead on actual orders sent to the mills so far this month as compared with the same period in May. The structural steel and plate department of the Carnegie Company reports that its actual bookings of orders this month are much the largest in over a year. A very heavy tonnage of structural steel has been placed and much more is pending. There is a good deal of inquiry for cars, but actual orders placed have been light for several weeks. The pig iron market is showing more activity and it is known that a number of large consumers have quietly closed for large lots of iron for third quarter and for last half of the year delivery, but at relatively low prices. The market on billets and sheet bars is quiet, most consumers being covered by contracts. On the night of June 30 a number of finishing mills will close down for inventory and repairs and for this reason sales of scrap and semifinished products have been light. The wage scales for the independent sheet and tin plate mills were settled at a conference held in Pittsburgh last Thursday, practically the same scale now in force being adopted for the year beginning July 1. A conference began Tuesday between committees of the Amalgamated Association and the Republic Iron & Steel Company, at which it was expected that a settlement of the puddling and heating scales would be arranged.

Ferromanganese.—There is practically no local inquiry, but a sale is reported at 200 tons for third quarter delivery to an outside consumer at \$36.50, Baltimore. We quote foreign 80 per cent. at \$36.50 to \$36.75 with a freight rate of \$1.95 a ton for delivery in the Pittsburgh district.

Ferrosilicon.—There is no new inquiry, nearly all consumers being covered ahead for the remainder of this year. We quote 50 per cent. at \$51.50 to \$52, Pittsburgh, for delivery over second half of the year; 10 per cent. blast furnace silicon, \$22; 11 per cent., \$24, and 12 per cent., \$25, f.o.b. cars Ashland and Jisco furnaces.

Muck Bar.—An inquiry is reported in the market for 500 tons of muck bar for July and August delivery, this being the first active inquiry that has come out for some months. We continue to quote best grades of muck bar made from all pig iron at nominally \$28.50 Pittsburgh.

Skelp.—A sale is reported of about 1500 tons of narrow sizes grooved steel skelp on the basis of 1.25c. delivered at buyer's mill in the Pittsburgh district. Prices are fairly strong. We quote grooved steel skelp at 1.25c.; sheared steel skelp, 1.35c.; grooved iron skelp, 1.50c. to 1.60c., and sheared iron skelp, 1.70c. to 1.75c., usual terms, all for delivery at consumers' mills in the Pittsburgh district.

Wire Rods.—A sale of 500 tons of open-hearth rods for chain purposes for July and August delivery is reported at \$27, Pittsburgh.

Structural Material.—A tremendous amount of new work is being figured on, and a good deal of tonnage has been placed. The American Bridge Company closed to-day for steel buildings for the new plant of the Pittsburgh-Crucible Steel Company, at Midland, Pa., 8500 tons, and the same concern has closed for 3800 tons of bridge work for the Louisville & Nashville Railroad, and has also received a contract from the United States Government for the building of 14 steel barges for delivery at Memphis and Vicksburg, which will take about 1700 tons of steel. The McClintic-Marshall Construction Company has taken 500 tons of steel for a new building for the International Harvester Company, and the King Bridge Company, Cleveland, Ohio, has taken 800 tons of steel for new bridges for

THE IRON AND METAL MARKETS

the Wheeling & Lake Erie Railroad. We quote beams and channels up to 15 in. at 1.35c., Pittsburgh.

Plates.—No orders for steel cars have been placed in the past week, but there are some active inquiries in the market. Among these are 1000 steel cars for the Baltimore & Ohio, 1000 for the Louisville & Nashville, 1000 for the Queen & Crescent, 2000 for the Erie, 450 for the Ann Arbor, 2000 for the Pennsylvania Railroad, and 1000 for the Virginian Railway. The Buffalo, Rochester & Pittsburgh Railroad has withdrawn an inquiry for 2000 sent out some time ago. The contract for the 4500 tons of plates for the Los Angeles aqueduct secured by the Treadwell Construction Company has not yet been placed. We quote ¼-in. and heavier plates at 1.35c., Pittsburgh.

Steel Rails.—The Carnegie Steel Company has taken an order for 500 tons of standard sections for the Pittsburgh Railways Company, and also received new orders and specifications against contracts in the past week for 4000 tons of light rails. The Texas Pacific Railroad is in the market for 16,000 tons of standard sections to be used for laying 125 miles of track. Prices on light rails are as follows: 12-lb. rails, 1.25c.; 16, 20 and 25-lb., 1.21c. to 1.25c.; 30 and 35-lb., 1.20c., and 40 and 45-lb., 1.16c. The prices are f.o.b. at mill, plus freight, and are the minimum of the market on carload lots, small lots being sold at a little higher price. Standard sections are held at 1.25c. per pound.

Sheets.—We continue to note an improved demand and also in specification against contracts for black and galvanized and also for roofing sheets. Several leading sheet mills report that new business is coming along very nicely and that shipments of sheets by the mills this month will show a material increase over May. The independent sheet and tin plate mills have reached a settlement on the sheet and tin plate scales with the Amalgamated Association and the mills will continue in operation except those that expect to close down on June 30 for inventory and repairs. The full schedule of prices on black and galvanized and on roofing sheets is printed on a previous page.

Tin Plate.—The new demand is very dull and specifications against contracts are coming in at only a fairly satisfactory rate. It is estimated that only from 60 to 65 per cent. of tin plate capacity is active at present.

Bars.—While the new demand for both iron and steel bars is only fair, a good deal of tonnage in steel bars has been closed on contracts on the 1.25c. basis to run over the remainder of this year. We quote steel bars at 1.25c. and iron bars at 1.25c. to 1.30c. f.o.b. Pittsburgh.

Rivets.—Inquiries for rivets are better and there has been some improvement in actual orders. Prices are recognized as being relatively low, and jobbers and consumers are a little more inclined to buy than they have been for some time. We quote structural rivets at 1.70c. to 1.75c. and boiler rivets at 1.80c. to 1.85c., these prices being shaded only on most desirable orders.

Wire Products.—So far the reduction of \$2 a ton in wire products, effective June 21, has not resulted in increased new demand, while specifications against contracts are not any better. This reduction was really not very significant as very little new business had been placed on the \$1.80 basis for wire nails, most consumers having covered at lower prices and had not taken out their contracts. We quote galvanized barb wire at \$2 per 100 pounds; painted, \$1.70; annealed fence wire \$1.50; galvanized \$1.80; wire nails \$1.70 and cut nails about \$1.60 f.o.b. Pittsburgh, full weight added to point of delivery. The quotation of \$1.60 on cut nails might be shaded on a desirable order.

Spikes.—The new inquiry for spikes is reported to be a little better, one road having placed recently an order for 2000 kegs and another for 2500 kegs, the business going to a local maker. We quote railroad spikes at \$1.50 base per keg f.o.b. Pittsburgh, with the usual extras for odd sizes.

Shafting.—As yet the new demand and specifications against contracts for shafting are only fair and mostly in small lots. However, early in August an improvement is expected, as the implement makers then usually commence to specify against their contracts for shafting. Regular discounts on shafting remain at 60 per cent. off in carloads and 55 per cent. in less than carloads, but on desirable orders these discounts are still being shaded.

Spelter.—The upward movement has stopped, and to-day's prices are easier with the tendency toward lower values. We quote prime grades of Western at 5.60c., East St. Louis, equal to 5.72½c., Pittsburgh. A sale of 50 tons to a local consumer at this price is reported.

Hoops and Bands.—The new demand is quiet and mostly for small lots to cover actual needs. While specifications against contracts from some sections of the country are quite active, from other places they are dull. The new mill of the Sharon Steel Hoop Company at Sharon, Pa., for rolling wide bands has been completed and put in operation and is working satisfactorily. We quote hoops at 1.40c. and bands at 1.25c., extras on the latter as per the steel bar card.

Merchant Steel.—One of the leading makers outside the Pittsburgh district reports that its actual orders and specifications against contracts in June showed an increase of about 20 per cent. over May. However, the general demand is quiet and mostly for small lots to cover actual needs, while specifications are only fair.

Merchant Pipe.—The Ohio Fuel Supply Company is inquiring for 25 miles of 16-in. line pipe and another gas interest is reported to have bought about 15 miles of 4-in. line pipe for delivery in Western gas territory. The new demand for merchant pipe is better so far this month than in May, and shipments in June will show an increase over last month. Regular discounts on iron and steel pipe are given on a previous page.

Boiler Tubes.—There is no improvement in new demand and specifications against contracts are also very dull. Prices on both iron and steel boiler tubes continue to be more or less shaded.

Coke.—The furnace coke trade has been quite active in the past week or 10 days, and a good deal of tonnage has been sold. A large blast furnace interest controlling a number of furnaces has bought 26,000 tons a month for July and August, of which 21,000 tons a month was taken by one interest on the basis of \$1.50 for certain brands of coke and \$1.55 for other makes. The other 5000 tons a month for July and August is taken by another coke maker, which has a blast furnace connection, and the coke is to be paid for in ore; that is, a certain number of tons of coke for a ton of ore. Another contract for 5000 tons of blast furnace coke per month over the last half of the year was made at \$1.60 at oven, and another for 9000 tons a month over the last half of the year at \$1.65 at oven. A third contract was made for 11,000 tons a month for the last half of the year at \$1.75 at oven. The seemingly high price on the last contract is accounted for by the fact that the coke specified must be Connellsville Old Basin coke and must be hand drawn. A large consumer of coke has had its regular supply shut off by labor troubles and has been an active buyer of furnace coke for prompt shipment. This interest is buying from 30 to 40 cars of prompt coke per day and is paying from \$1.50 to \$1.55 at oven for it, the coke to be strictly high grade. For this reason the supply of furnace coke for prompt shipment is somewhat lessened and prices are a shade firmer. There is also a good deal of inquiry in the market for foundry coke, the American Locomotive Company, the Pressed Steel Car Company and several other large consumers having inquiries out for a good deal of tonnage. We quote best grades of furnace coke for prompt shipment at \$1.45 to \$1.50; for July and August, \$1.55 to \$1.60, and for last half of the year, \$1.60 to \$1.65, all per net ton at oven. We quote standard makes of 72-hour foundry coke for spot shipment at \$1.85 to \$2 and for last half of the year at prices ranging from \$2.10 up to \$2.40 per net ton at oven. Some grades of furnace and foundry coke lower in quality than the above are offered at lower prices. For the first time since last March the weekly output of coke in the Upper and Lower Connellsville regions shows an increase, the production of these two regions for the week ending June 24 having been 271,088 tons, an increase over the previous week of about 5000 tons. Shipments showed an increase of 120 cars.

Iron and Steel Scrap.—The scrap trade has quieted down materially, consumers being pretty well covered and not desiring to take in any more in June than necessary on account of inventory and repairs which will start July 1. Quite a few consumers of scrap will close their plants on the night of June 30, and while they are willing to buy for delivery ahead they are not disposed to purchase for prompt shipment. One consumer has bought 4000 to 5000 tons of heavy steel scrap in the past week or 10 days on the basis of \$13 delivered at con-

THE IRON AND METAL MARKETS

suming point. Prices are fairly strong with the exception of low phosphorus melting stock, which is very dull and can hardly be sold at any price. Dealers are now quoting per gross ton, f.o.b. Pittsburgh, as follows:

Heavy steel scrap Steubenville, Follansbee, Sharon, Monessen and Pittsburgh delivery.	\$13.00 to \$13.25
No. 1 foundry cast.....	13.25 to 13.50
No. 2 foundry cast.....	12.75 to 13.00
Bundled sheet scrap, f.o.b. consumers' mill, Pittsburgh district.....	10.75 to 11.00
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	13.50 to 13.75
No. 1 railroad malleable stock.....	12.00 to 12.25
Grate bars.....	10.50 to 10.75
Low phosphorus melting stock.....	16.00 to 16.25
Iron car axles.....	23.75 to 24.00
Steel car axles.....	18.50 to 18.75
Locomotive axles.....	23.00
No. 1 bushing scrap.....	12.00 to 12.25
No. 2 bushing scrap.....	8.50 to 8.75
Old car wheels.....	13.50 to 13.75
Sheet bar crop ends.....	15.50 to 15.75
*Cast from borings.....	8.75 to 9.00
*Machine shop turnings.....	9.00 to 9.25
Old iron rails.....	15.00 to 15.25
No. 1 wrought scrap.....	14.25 to 14.50
Heavy steel axle turnings.....	10.00 to 10.25
Stove plate.....	10.50 to 10.75

*These prices are f.o.b. cars at consumers' mill in the Pittsburgh district.

Cincinnati

CINCINNATI, OHIO, June 27, 1911. (By Telegraph.)

Pig Iron.—There is an optimistic undercurrent of feeling, probably induced by an increased number of inquiries coming in. Order books also show some improvement, but the bulk of business now transacted covers small tonnages only, although it is rumored that the larger melters of pig iron are cautiously feeling round and it is quite possible that the next few weeks will see a change for the better. Even consumers now generally admit that the bottom has been reached and that the furnaces cannot continue present quotations very much longer. A southern Ohio manufacturer is asking for an additional round lot of basic, and from Michigan there are several inquiries for No. 2 foundry, running from 300 to 500 tons. A part of the No. 2 soft iron wanted by a Louisville interest has been purchased, but the bulk of the order was not placed. St. Louis furnished an inquiry for about 5000 tons of malleable and a northern Ohio concern wants 1000 tons, all for last half shipment. Prices remain stationary, although Northern No. 2 foundry is obtainable for spot shipment around \$13, Ironton. Malleable is quoted at \$13.25 to \$13.50 at furnace. Southern No. 2 foundry remains at \$10 Birmingham, and shipments at this figure could be extended through the third quarter with the probability that a desirable tonnage for last half delivery would not be turned down. On the other hand, several furnaces are holding out for \$10.50 and will not sell below this price. Based on freight rates of \$3.25 from Birmingham and \$1.20 from Ironton we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry and 1 soft....	\$13.75 to \$14.25
Southern coke, No. 2 foundry and 2 soft....	13.25 to 13.75
Southern coke, No. 3 foundry.....	13.00 to 13.25
Southern coke, No. 4 foundry.....	12.50 to 12.75
Southern gray forge.....	12.00 to 12.50
Ohio silvery, 8 per cent. silicon.....	17.45 to 17.70
Lake Superior coke, No. 1.....	14.70 to 14.95
Lake Superior coke, No. 2.....	14.20 to 14.45
Lake Superior coke, No. 3.....	13.70 to 13.95
Basic, Northern.....	14.45 to 14.70
Standard Southern car wheel.....	25.75 to 26.25
Lake Superior car wheel.....	19.00

(By Mail)

Coke.—There is a small inquiry from this territory for furnace coke, the entire quantity being about 2000 tons, and it is understood this is wanted for third quarter shipment. Several Eastern furnaces are said to be feeling around for a future supply and to cover, in one case, a 12 months' supply. Foundry coke shows some improvement, and a number of contracts have been closed lately, although no large tonnage is involved. There are no changes in price, but there is not any great scramble on the part of producers to take on business at prevailing spot shipment quotations. Furnace coke is quoted in the Connellsville district around \$1.40 to \$1.55 per net ton at oven, for prompt shipment, and ranges from the last named figure to \$1.75 for last half movement. Wise County and Pocahontas quotations average about 5c. a ton higher. Foundry coke is quoted in all three districts around \$1.95 to \$2 for prompt shipment and from \$2 to \$2.35 on contracts.

Finished Material.—Steel bars and structural material show special activity, as compared with nearby weeks. Local agencies think that the present demand shows no spasmodic symptoms and that business will gradually increase until it is at least normal. There is also an improvement in the small order trade. Sheets continue to move fairly well, and taking everything into consideration there is a brighter outlook to the situation. Warehouse prices continue at 1.70c. for steel bars and 1.80c. for structural material. There is no trouble in making prompt delivery on any standard warehouse stock.

Old Material.—The railroads have been reported as selling small quantities of scrap, but generally they are holding back for better prices. So far as consumers are concerned purchases are limited to immediate requirements, although there are some medium sized lots of scrap being bought under cover. Prices for delivery in buyers' yards, southern Ohio and Cincinnati, are as follows:

No. 1 railroad wrought, net ton.....	\$11.50 to \$12.00
Cast borings, net ton.....	4.50 to 5.00
Steel turnings, net ton.....	5.50 to 6.00
No. 1 cast scrap, net ton.....	9.50 to 10.00
Burnt scrap, net ton.....	6.50 to 7.00
Old iron axles, net ton.....	16.50 to 17.00
Bundled sheet scrap, gross ton.....	7.25 to 8.25
Old iron rails, gross ton.....	13.50 to 14.00
Relaying rails, 50 lb. and up, gross ton....	21.00 to 22.00
Old car wheels, gross ton.....	10.75 to 11.75
Heavy melting steel scrap, gross ton.....	10.00 to 10.50

Cleveland

CLEVELAND, OHIO, June 27, 1911.

Iron Ore.—While there is practically no inquiry for ore, the feeling among sellers is better than it has been for some time because of the improved demand for steel. Some consumers will need additional tonnage, but it is expected that in most cases the placing of these orders will be deferred until rather late in the season. Little change is noted in the lake shipping situation. Vessel tonnage, except in small boats for coal cargoes, still exceeds the supply. The chartering of 75,000 tons for ore transportation is reported. Vesselmen do not look for much improvement for another month. We quote prices as follows: Old range Bessemer, \$4.50; Mesaba Bessemer, \$4.25; old range non-Bessemer, \$3.70; Mesaba non-Bessemer, \$3.50.

Pig Iron.—The improved inquiry noted last week has resulted in the placing of a few contracts for foundry grades for the last half, but not many additional inquiries have come out. The largest inquiry, which came from a northern Ohio consumer, for 2000 tons of foundry iron, has been withdrawn. Several other consumers are still negotiating for lots of 500 tons and under. The Southern Ohio Steel Company, which had an inquiry out last week for a round lot of basic iron for the last half, is reported to be still in the market for from 5000 to 15,000 tons. July will start with only a limited tonnage of foundry iron bought in this territory for the last half delivery. Many consumers, however, have enough iron left over from second quarter contracts to last them for several weeks. Cherry Valley furnace of the United Iron & Steel Company, Leetonia, Ohio, was blown out last week. This is the third stack controlled by Cleveland interests to be blown out during June. Prices are unchanged at \$13.50 to \$13.75, Cleveland, for outside shipment, Valley furnace, for No. 2 foundry, but some sellers appear unwilling to meet this price. For prompt shipment and for the last half we quote, delivered Cleveland, as follows:

Bessemer.....	\$15.90
Basic.....	14.00
Northern foundry, No. 2.....	14.25
Gray forge.....	13.25
Southern foundry, No. 2.....	\$14.35 to 14.85
Jackson Co. silvery, 8 per cent. silicon....	17.50 to 17.75

Coke.—Some contracts for foundry grades for the last half are being placed, but the market is generally quiet. There is no demand for furnace grades. We quote standard Connellsville furnace coke at \$1.40 to \$1.50 per net ton, at oven, for prompt shipment, and \$1.60 to \$1.75 for the last half. Connellsville 72-hour foundry coke is held at \$1.75 to \$2 for prompt shipment and \$2 to \$2.35 for the last half.

Finished Iron and Steel.—The improved demand in finished lines noted last week continues and the feeling in the trade shows a marked improvement. Mills are getting a fair volume of specifications for bars and the

THE IRON AND METAL MARKETS

demand for structural material is quite active. Liberal orders are coming from fabricating shops. Some new steel bar contracts are being placed, although a few buyers, particularly in the implement trade, are holding back with the hope of getting price concessions. This is attributed largely to the fact that there are still rumors that the 1.25c. price is being shaded. The market is firmer, however, and the reports of shading have perhaps arisen from the fact that one selling agency has not withdrawn a few 1.20c. quotations that were made to the implement trade some time ago. New structural contracts include 800 tons for bridge work for the Wheeling & Lake Erie Railroad, awarded to the King Bridge Company, Cleveland, and 400 tons for an addition to the plant of the Adams-Bagnell Electric Company, Cleveland, awarded to the National Iron & Wire Company. Injunction suits brought in connection with the grade crossing elimination work of the Pennsylvania Railroad in Cleveland and the building of a new bridge over the Cuyahoga River in Cleveland have been disposed of, so that both of these improvements can now proceed. They will require a large tonnage of steel. The Cleveland Railway Company has placed an order with the Lackawanna Steel Company for 500 tons of standard section rails for extensions. The contract for the six-story Commercial building, Cleveland, has been awarded to the Crowell & Sherman Company. It has not been decided whether this building will be of structural steel or reinforced concrete. Prices of rivets are weak, structural rivets being quoted at 1.60c., Pittsburgh, for car lots, and boiler rivets at 1.70c., a quotation of \$1 a ton more being made for less than car lots. The demand for hard steel bars is fairly active. Mills are quoting rerolled hard steel bars at 1.15c., Pittsburgh, for prompt shipment, and 1.20c. for contract. The demand for iron bars is light. We quote iron bars at 1.25c. to 1.30c., Cleveland. The two local bar iron mills operated by the Union Rolling Mill Company and the Empire Rolling Mill Company will shut down July 1. When they will start up again will depend on business conditions. The city of Cleveland will receive proposals July 5 for about 4000 tons of cast iron pipe for the water works department.

Old Material.—The market shows very little activity. Local consumers are offering \$11.25 for heavy steel scrap for future delivery, which is about 50 cents a ton lower than dealers can get for shipment to Sharon, the price at the latter point being \$12.75 with \$1 freight added. Yard dealers are looking for better prices shortly and are generally holding for an advance, selling at current prices only the scrap that they are anxious to move. Producers are also waiting for higher prices and are not offering much material. There is practically no demand for cast scrap. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows, all quotations being unchanged:

Old steel rails, rerolling.....	\$13.00 to \$13.50
Old iron rails	15.00 to 15.50
Steel car axles	17.50 to 18.00
Heavy melting steel	11.25 to 11.50
Old car wheels	11.50 to 12.00
Relaying rails, 50 lb. and over.....	22.50 to 23.50
Agricultural malleable	10.75 to 11.00
Railroad malleable	11.00 to 11.50
Light bundled sheet scrap.....	7.50 to 8.00

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles.....	\$21.00 to \$21.50
Cast borings	6.00 to 6.25
Iron and steel turnings and drillings.....	6.50 to 6.75
Steel axle turnings	8.00 to 8.50
No. 1 busheling	9.50 to 10.00
No. 1 railroad wrought.....	11.50 to 12.00
No. 1 cast	11.25 to 11.50
Stove plate	9.50 to 10.00
Bundled tin scrap.....	11.00 to 11.50

Chicago

CHICAGO, ILL., June 27, 1911.

Evidences are here and there apparent that some of the slack in mill operations is being taken up. An additional furnace blown in, as at South Works; a bar mill running at full capacity, as at East Chicago; sheet mills running full, as at Indiana Harbor, are instances. In addition to domestic tonnage it is stated that at Chicago 73,000 tons of steel is being rolled for export to Canada. The first three weeks of June show the first real consecutive and continuous business since February. There has been no rush; it is just continuing to come steadily and this has led to a growing belief that the midsummer months will be followed by a period of steady and substantial progress. The rail

tonnage for the week reached 14,000 tons, building shapes aggregated 6000 tons, a favorable showing for steel bars is reported and increased interest is displayed in pig iron. The general market situation is not yet good. In some directions, like the old material situation, there is much to be hoped for, but it is better.

Pig Iron.—While the pig iron market is still considered to be soft, even on the very low basis of \$10, Birmingham, for Southern No. 2 foundry iron, and \$15, f.o.b. furnace for local irons, these prices are so low as to bring out during the week inquiries to the amount of about 12,000 tons. It is hoped that this interest will ultimately result in orders, but it is felt that the immediate purpose is a testing of the market strength. These inquiries cover delivery through the last half and into the first quarter. They include one lot of 2500 tons and one of 2000 tons for Illinois melters, a lot of 750 tons of basic for a Milwaukee steam shovel manufacturer, an aggregate of some 3000 tons of malleable and several cars of analysis iron for an Ohio plant of an agricultural implement manufacturer. The feeling is that an aggregate tonnage of considerable size, made up of many comparatively small lots, will eventually be placed because of the unquestionable attractiveness of prevailing prices. The market quotation for local Northern irons continues to be \$15, f.o.b. furnace, with a switching charge of from 25 to 50 cents. At the same time it is possible to buy Detroit or Toledo iron or Buffalo iron at least as low as \$13.25, f.o.b. shipping point, and report has it that \$13 will be done. These prices would make the Chicago delivered prices of these irons \$14.70 to \$14.95 if the makers should feel disposed to sell in this market. This is simply indicative of the strength of the local situation. We continue to quote for Chicago delivery, with the exception of local irons which are f.o.b. furnace, the following prices:

Lake Superior charcoal.....	\$16.50 to \$17.00
Northern coke foundry, No. 1.....	15.50
Northern coke foundry, No. 2.....	15.00
Northern coke foundry, No. 3.....	14.75
Northern Scotch, No. 1.....	16.00
Southern coke, No. 1 foundry and No. 1 soft.....	14.85 to 15.10
Southern coke, No. 2 foundry and No. 2 soft.....	14.35 to 14.60
Southern coke, No. 3.....	14.10 to 14.35
Southern coke, No. 4.....	13.85 to 13.85
Southern gray forge.....	13.60 to 13.85
Southern mottled	13.60 to 13.85
Malleable Bessemer	15.00
Standard Bessemer	17.40
Basic	15.50
Jackson Co. and Kentucky silvery, 6 per cent.....	17.90
Jackson Co. and Kentucky silvery, 8 per cent.....	18.90
Jackson Co. and Kentucky silvery, 10 per cent.....	19.90

Rails and Track Supplies.—During the week specifications providing for a total of 14,000 tons of rails were received for rolling at the local mills. The principal item was a 5000-ton lot from the Great Northern Railway. The rolling schedules of the Chicago mills have been materially augmented by orders for export rails to Canada. Orders for track fastenings are in keeping with the rail tonnage. Prices, while not decidedly firm, are fairly well maintained. We quote standard railroad spikes at 1.65c. to 1.75c., base; track bolts with square nuts, 2.10c. to 2.20c., base, all in carload lots, Chicago. Standard section Bessemer rails, 1.28c.; open hearth, 1.34c.; light rails, 40 to 45 lb., 1.16c. to 1.20½c.; 30 to 35 lb., 1.19½c. to 1.24c.; 16, 20 and 25 lb., 1.20½c. to 1.25c.; 12 lb., 1.25c. to 1.30½c., angle bars, 1.50c. to 1.60c. Chicago.

Structural Material.—Specifications for bridge and steel car structural shapes are now being entered in current rollings against contracts placed several weeks ago together with a considerable tonnage still to be rolled for Chicago buildings. That a satisfactory amount of business is now in hand may be judged from the fact that the railroad structural contracts recently closed will probably total close to 100,000 tons for the roads buying in this market. The Woodmen of the World building at Omaha steel will be fabricated by the Noelke-Richards Iron Works. The contract covers about 2800 tons. The McClintic-Marshall Construction Company will furnish 450 tons for a concentrating plant for the Hawkins mine of the Wisconsin Steel Company at Nashwauk, Minn. We quote plain material from mill at 1.53c. to 1.58c. and from jobbers' stocks, 1.75c. Chicago.

Plates.—A steady run of plate tonnage is reported as being placed during the past three weeks. The entire volume of business probably is not large except in comparison with the preceding dullness. Tank steel and boiler plates as well as plates for structural purposes are well distributed among the orders. The Illinois

THE IRON AND METAL MARKETS

Steel Company will furnish the steel for 16 miles of 54-in. stave pipe at Tacoma, Wash., involving 2000 tons of bands, 4500 ft. of riveted steel pipe and 600 ft. of steel trestle. Chicago quotations for mill shipment are 1.53c. to 1.58c.; for store shipment, 1.75c.

Sheets.—The volume of orders in sheets continues to be of a magnitude sufficient to maintain the 18 sheet mills of the Inland Steel Company in full operation. The duration of activity in this direction is, however, not accepted as assured, although the present prices for sheets are apparently well received and the trade willing to contract farther ahead than seems desirable to the mills. Chicago prices are as follows: Carload lots, from mill: No. 28 black sheets, 2.18c.; No. 28 galvanized, 3.08c.; No. 10 blue annealed, 1.68c. Prices from store, Chicago, are: No. 10, 1.95c. to 2.05c.; No. 12, 2.00c. to 2.10c.; No. 28 black, 2.60c. to 2.70c.; No. 28 galvanized, 3.35c. to 3.45c.

Bars.—An estimate of the tonnage taken by one of the largest makers of steel bars places its June bookings as to date as 50 per cent. in excess of May orders. It seems probable that this represents conservatively the general situation. For standard sizes, and from the leading interests only regular prices are obtainable, but it is reported that where an order for a certain size may fit conveniently in the rolling schedule of some of the mills of more limited capacity concessions can be obtained for immediate shipment business. Bar iron has been active and an East Chicago mill has been rolling to full capacity since June 21 with orders sufficient to maintain this condition up to July 1. We quote as follows, f.o.b. Chicago: Soft steel bars, 1.43c.; bar iron, 1.20c. to 1.25c.; hard steel bars, rolled from old rails, 1.20c. to 1.25c. From store, soft steel bars, 1.70c. to 1.80c., Chicago.

Wire Products.—Reports indicate that the decline in the prices of wire products was well received. While the midsummer quiet will hardly be affected belief is expressed that a volume of delinquent business will be attracted by the more favorable prices and a natural flow of orders may be expected. Plain and barb wire are not moving actively and wire nails are still the disappointment they have been for some time past. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire, No. 9 and coarser, base, 1.68c.; wire nails, 1.78c.; painted barb wire, 1.78c.; galvanized, 2.18c.; polished staples, 1.88c.; galvanized, 2.18c., all Chicago.

Cast Iron Pipe.—The buying of cast iron pipe reported for the week totals close to 12,000 tons without including a satisfactory run of miscellaneous business. The Great Northern Railway has ordered 1000 tons; the city of Muskogee, Okla., 2500 tons, and the contract for 7500 tons for San Diego has finally been formally awarded to the leading interest. The United States Cast Iron Pipe & Foundry Company will also furnish a considerable tonnage of large size pipe for Los Angeles, Cal. During the present week contracts will be let at Hammond, Ind., for 2000 tons, and at Columbus, Ohio, for 950 tons. Several hundred tons of pipe have been included in orders from the Northern Pacific, the Chicago, Burlington & Quincy, and the Illinois Central roads. We continue to quote as follows, per net ton, Chicago: Water pipe, 4 in., \$25.50; 6 to 12 in., \$24.50; 16 in. and up, \$24, with \$1 extra for gas pipe.

Old Materials.—Railroad lists offered for bids to be received during the current week total close to 11,000 tons and include about 5000 tons from the Chicago, Rock Island & Pacific, 4000 from the Chicago, Burlington & Quincy, and 1200 from the Chicago, Minneapolis, St. Paul & Omaha. Railroad wrought, old steel rails and cast scrap constitute the larger items. The atmosphere of the scrap market is cramped as it reflects the speculative buying for a small margin of profit, the laggard filling of orders at a loss, and the careful holding of that stock of scrap which will yield the large profit at some later day when prices rise. The Indiana Harbor mill is again accepting shipments. We quote below for delivery to buyer's works, all freight and transfer charges paid, per gross ton:

Old iron rails	\$14.00 to \$14.50
Old steel rails, rerolling	12.25 to 12.50
Old steel rails, less than 3 ft.	11.00 to 11.50
Relaying rails, standard sections, subject to inspection	24.00
Old car wheels	12.50 to 13.00
Heavy melting steel scrap	10.25 to 10.75
Frogs, switches and guards, cut apart	10.25 to 10.75
Shoveling steel	9.75 to 10.25
Steel axle turnings	8.50 to 9.00

The following quotations are per net ton:

Iron angles and splice bars	\$12.50 to \$13.00
Iron arch bars and transoms	13.75 to 14.25
Steel angle bars	10.25 to 10.75
Iron car axles	18.00 to 18.50
Steel car axles	16.00 to 16.50
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	10.00 to 10.50
Steel knuckles and couplers	9.00 to 9.50
Locomotive tires, smooth	16.00 to 16.50
Machine shop turnings	6.25 to 6.75
Cast and mixed borings	5.25 to 5.75
No. 1 busheling	8.75 to 9.25
No. 2 busheling	6.75 to 7.25
No. 1 boilers, cut to sheets and rings	7.50 to 8.00
Boiler punchings	12.00 to 12.50
No. 1 cast scrap	10.25 to 10.75
Stove plate and light cast scrap	9.00 to 9.50
Railroad malleable	10.00 to 10.50
Agricultural malleable	9.25 to 9.75
Pipes and flues	8.00 to 8.50

Philadelphia

PHILADELPHIA, June 27, 1911.

There has been about an even demand for both crude and finished materials. Pig iron buying continues, however, along narrow lines, recent price reductions not having as yet brought about any heavy buying in this district. In finished materials new orders and specifications against contracts have enabled some mills to increase their productive rate, although the majority are still operating on an unchanged basis. Under existing conditions steel mills do not anticipate any extended suspension over the national holiday; some, in fact, will be idle but a few days. The billet market still drags. Foundry coke is moderately active and an increased demand for furnace coke has developed. Old material is quiet.

Iron Ore.—Reports of the recent sale of 3,000,000 tons of Swedish iron ore to one of the Eastern independent steel plants have been definitely confirmed, although particulars are lacking, except that deliveries which are to begin at once are to extend over a period of eight or nine years. Negotiations with another consumer are pending for the purchase of 150,000 tons of the same grade of ore. Importations during the week include 12,400 tons of Newfoundland, 7703 tons of Swedish and 8880 tons of Cuban ore.

Pig Iron.—A reduction of 25 cents a ton in eastern Pennsylvania standard analysis iron has been firmly established, but as far as can be learned has not yet resulted in any marked buying. Several producers, while not openly quoting lower prices, state that they will meet the reduction when necessary. Under existing conditions eastern Pennsylvania No. 2 X foundry for third quarter is quotable at \$15 to \$15.25, delivered, with No. 2 plain at \$14.75 to \$15; the usual 50 cents differential between those grades not being observed. The lower quotations have no doubt stimulated inquiry to some extent, but the bulk of this has been for the purpose of testing the market, sales in the majority of cases being confined to small lots, few exceeding 100 tons. The inquiry of the Pennsylvania Railroad, reported last week, is still unclosed, but it is expected that orders will be given out this week. One of the Delaware River pipe foundries has purchased upward of 1000 tons of special analysis iron for early shipment and has an inquiry out for 5000 tons of foundry forge and No. 3 foundry in equal quantities, for September delivery, against which Southern iron will no doubt be taken. Virginia pipe makers are also reported to have made moderate purchases of low grade iron from producers in that district. Very little movement of the higher Virginia foundry grades is to be noted in this vicinity. Small sales are reported at unchanged prices, although one producer announces the sale of 1000 tons for New England delivery at \$12.50 furnace. Occasional carload lot sales of No. 2 Southern foundry are reported, in most instances at \$10.50, Birmingham, but there is no large lot demand, except in low grade irons. There is little demand for forge iron, although one of the Eastern mills is understood to have contracted for a moderate quantity at a price said to have been close to recent minimum quotations. There is less movement in the steel making grades; moderate lots of basic iron for third quarter delivery are still before the trade, but consumers hold for lower than quoted prices, but have so far been unable to get concessions. Small sales of low phosphorus iron, at the market, are reported. As a rule producers report deliveries as being freely taken, with production in this district, to all appearances, slightly under the consumptive rate. One merchant furnace, Carbon, in the Lehigh Valley has

THE IRON AND METAL MARKETS

blown out, but the remaining active Swede furnace in the Schuylkill Valley, which was to have been blown out last week, is still in blast, it having been determined to keep it active for at least another 30 days. While current buying has not been large, producers in this district look forward to a better movement after the holiday, as quite a few consumers have a considerable share of their usual third quarter purchases still to contract for. The following range of prices is named for standard brands, delivered in buyers' yards in this territory, during the third quarter:

Eastern Pennsylvania No. 2 X foundry.....	\$15.00 to \$15.25
Eastern Pennsylvania No. 2 plain.....	14.75 to 15.00
Virginia foundry	15.05 to 15.50
Gray forge	14.50
Basic	14.50 to 14.75
Standard low phosphorus.....	20.50 to 20.75

Ferromanganese.—The market has been bare of any inquiry from consumers in this district, and prices are nominally quoted at \$36.50, Baltimore, for 80 per cent.

Billets.—Little change in the demand is reported. Consumers continue to place orders for small lots for prompt shipment, although inquiries are occasionally reported for larger quantities for extended delivery, but seldom develop into actual orders. Forging billets are still in relatively better demand than rolling billets. Prices are firm at \$23.40 for rolling billets and \$28.40 for ordinary forging steel, delivered in this vicinity.

Plates.—A very fair demand for plates comes out from day to day, and while the bulk of the orders are for moderate quantities an occasional fair sized order is booked. A very satisfactory demand for plates for structural and bridge work is reported, with a comparatively even demand for other classes of plates. Mills maintain about an even productive rate and aggregate orders measure up well with business taken during the previous week. Prices are firm at 1.50c. for ordinary plates delivered in this district, and while producers, as a rule, adhere to the policy of confining contracts to third quarter delivery, more extended delivery could no doubt be had if the business offered was desirable.

Structural Material.—While the actual amount of business developing in this immediate vicinity does not show any marked change, fabricators are figuring on considerable business in building and bridge work in other districts, in fact this branch of the finished material lines is about the most active on the list. The contract for the Ritz-Carlton Hotel, in this city, has not yet been placed, nor has that for the new hotel in Wilmington, Del. New business pending includes the fabricated work for the new pier for the Old Dominion Line, Norfolk, Va., and the First National Bank Building, Richmond, Va. Considerable bridge inquiry from the railroads is also being figured on. While fabricated prices are still reported low, it is contended that they are at rock bottom, which, however, is said to be below what can be done by some of the smaller fabricators. A fair demand for plain shapes is reported and in instances mills are more fully engaged. The Pencoyd plant of the American Bridge Company is now operating at full capacity. Prices of plain structural shapes are maintained at 1.50c., delivered in this vicinity.

Sheets.—Mills in this district are, for the most part, operating at full capacity and in instances are being urged for deliveries. While current orders are individually small, the aggregate volume of business coming to the mills is comparatively large, although practically all for early shipment. Suspension at the mills on July 1 is not expected to be of extended duration, makers planning to start up again on the 10th inst. Quotations remain unchanged, the following range, f.o.b. eastern maker's mill, being named for early shipments: Nos. 18 to 20, 2.30c.; Nos. 22 to 24, 2.40c.; Nos. 25 to 26, 2.50c.; No. 27, 2.60c.; No. 28, 2.80c.

Bars.—The demand is not very active. Consumers of refined iron bars are not placing large orders, preferring to cover their requirements from time to time, as occasion demands. Specifications for steel bars are heavier and mills are now pretty well engaged. Quotations remain at 1.40c. for steel bars and 1.27½c. to 1.32½c. for refined iron bars, delivered in this district.

Coke.—A more active demand has developed for furnace coke. Consumers who have been putting off buying until a better insight into the future could be had are coming into the market for supplies for the last half and the trade now has inquiries from large furnace interests in this district, which aggregate about 100,000 tons, based on their present consumptive rate. Quite a wide range of quotations has also developed, some producers not being willing to accept forward business at a flat price, and while \$1.45 to \$1.50 at oven has been

named for spot delivery, \$1.60 to \$1.65 is frequently quoted for third quarter and \$1.70 to \$1.75 for fourth quarter, with \$1.75 to \$1.85 about representing the market for shipments extending over twelve months. Moderate sales of foundry coke, both for prompt and last half delivery, are also reported, but the bulk of the business in the latter grade has been in small lots. The following range of prices, per net ton, delivered in this vicinity, is named:

Connellsville furnace coke.....	\$3.65 to \$4.00
Foundry coke	4.10 to 4.55
Mountain furnace coke.....	3.25 to 3.60
Foundry coke	3.70 to 4.15

Old Material.—The market is extremely quiet; consumers take occasional odd lot offerings, but show little interest in the market. The principal transactions have been between dealers, such purchases being made to apply on contracts, deliveries on which must be made, in instances, before the close of the month. In few cases have transactions been such as to establish actual market quotations. The following quotations, while largely nominal, represent sellers' ideas for moderate lots for prompt delivery in buyers' yards, eastern Pennsylvania and nearby points, carrying a freight rate from Philadelphia varying from 35c. to \$1.35 per gross ton:

No. 1 heavy melting steel scrap.....	\$13.00 to \$13.25
Old steel rails, rerolling (nominal).....	13.75 to 14.25
Low phosphorus heavy melting steel scrap.....	16.75 to 17.25
Old steel axles (nominal).....	19.25 to 19.75
Old iron axles	24.00 to 24.50
Old iron rails	16.50 to 17.00
Old car wheels	13.00 to 13.50
No. 1 railroad wrought.....	15.00 to 15.50
Wrought iron pipe	12.00 to 12.50
No. 1 forge fire.....	10.50 to 11.00
No. 2 light iron (nominal).....	6.75 to 7.25
Wrought turnings	8.50 to 9.00
Cast borings	8.00 to 8.50
Machinery cast	13.00 to 13.50
Railroad malleable	11.50 to 12.00
Grate bars, railroad	10.90 to 10.50
Stove plate	9.75 to 10.25

Buffalo

BUFFALO, N. Y., June 27, 1911.

Pig Iron.—New inquiry the current week has been considerably larger than for the previous week, and a fairly good sized tonnage of foundry and malleable grades has been booked from New England, New York State and New Jersey points, aggregating about 4500 tons. This total includes one order of 1500 tons 2 X foundry for last half delivery from a New York State user, the remainder being confined principally to small and scattering lots. Prices remain about the same as last week, with a slight tendency toward hardening on the part of a number of furnace interests, which are disinclined to continue to take bookings at the unprofitably low schedule which has been prevailing. Other producers are still taking business at the minimum of the schedule, particularly from competitive points outside of districts tributary to Buffalo. We quote as follows for delivery over last half f.o.b. Buffalo:

No. 1 X foundry.....	\$13.75 to \$14.25
No. 2 X foundry.....	13.25 to 14.00
No. 2 plain	13.25 to 13.75
No. 3 Foundry.....	13.00 to 13.25
Gray forge	13.00 to 13.25
Malleable	13.75 to 14.25
Basic	14.00 to 14.75
Charcoal	16.50 to 17.25

Finished Iron and Steel.—Continued improvement in demand is noticeable in most lines of finished products, steel bars being particularly active. Specifications on bar product contracts have increased materially during the week, and several orders for good tonnages have been placed with a considerable tonnage still under negotiation. Prices on bars are very firm at 1.25c., base, Pittsburgh. Agricultural implement people are buying freely of bars and small shapes. One interest reports the closing of one contract for 1500 tons with an implement manufacturer in the week. Fredericks & Spns, Rochester, N. Y., have received the contract for 1000 tons of steel reinforcing bars for an additional concrete factory building to be erected by the Eastman Kodak Company of that city. The Lackawanna Steel Company is now operating its bar mill to full capacity. Plates and structural shapes show active demand and a considerable tonnage is being placed. In sheets inquiry is becoming stronger and some fairly good bookings are reported. In the Canadian export trade further large inquiry has de-

THE IRON AND METAL MARKETS

veloped during the week, and a good tonnage of orders has been placed, including contracts for agricultural implement materials. There is pronounced activity in fabricated structural materials, many new building projects, principally of moderate size, being on the boards for figures. Plans are being drawn by local architects for the Lawrence Hotel, to be erected by the Erie Hotel Company, Erie, Pa., requiring about 800 tons. Bids will be received this week for steel for remodeling the Gould Washington street building, Buffalo, 100 tons; for 150 tons structural steel for understructure of flushing tank No. 2 for the Niagara Falls Power Company, Niagara Falls, N. Y.; and in about two weeks for 500 tons for St. Mary's Hospital building, Niagara Falls, Ont., and 750 tons for the Technical High School, Buffalo. The Buffalo Structural Steel Company has received the contract for steel for an additional factory building for the Huebner-Bleistein Patents Company, Buffalo, 325 tons, and for about 250 tons for the John H. Smith building, Buffalo, one-half of which is to be of Bethlehem shapes. The contract for steel for Rand Hall, Cornell University, Ithaca, N. Y., about 150 tons, was taken by the Grotton Bridge Company. Bids are being taken this week for a large reinforced concrete building to be added to the plant of the Pennsylvania General Electric Company, Erie, Pa., requiring a large tonnage of steel reinforcing bars.

Old Material.—A slight increase in demand is noted in this market and more of a tendency on the part of consumers to take on new supplies. This condition has caused a hardening in prices, and in some grades advances are recorded. This is particularly true of heavy melting steel, while turnings and borings are maintaining the advance noted last week. We quote as follows per gross ton f.o.b. Buffalo:

Heavy melting steel.....	\$12.25 to \$12.75
Low phosphorus steel.....	14.50 to 15.00
No. 1 railroad wrought.....	13.50 to 14.00
No. 1 railroad and machinery cast scrap.....	13.00 to 13.75
Old steel axles.....	18.00 to 18.50
Old iron axles.....	22.00 to 22.50
Old car wheels.....	12.75 to 13.25
Railroad malleable.....	11.50 to 12.00
Boiler plate.....	10.00 to 10.50
Locomotive grate bars.....	10.00 to 10.25
Pipe.....	9.00 to 9.25
Wrought iron and soft steel turnings.....	6.50 to 7.00
Clean cast borings.....	6.25 to 6.50

St. Louis

St. Louis, Mo., June 26, 1911.

There is a distinctly better sentiment in the iron and steel market this week than for some time past. The tendencies which have been noted in the last few weeks are assuming shape, and a very strong belief exists that orders will provide an atmosphere of tangibility within a very short time. The fact that orders, both for immediate delivery on special sales and on specifications on contracts, have been very good the past week is taken as indicative of a much more active interest on the part of buyers, especially when coupled with many more inquiries on new contracts than for some time. The interest of the larger buyers in the market is of a more decisive character while the smaller purchasers are taking supplies with a gratifying degree of regularity. In rails an order for 500 tons of standard section, in coke an order for 42 cars, and in pig iron an inquiry for 2400 tons of Southern, represent the maximum of the items recorded, but with it all is a better feeling which is of unusual consequence at a time of year which is the dullest under ordinary conditions.

Pig Iron.—The general business in pig iron continues to show good tendencies. A number of spot purchases have been made, none of great size, but with the aggregate amounting to a reasonable total. The requisitions on contracts have been excellent and on the whole conditions are satisfactory. Inquiries are increasing steadily and their tenor is taken by the houses represented here to promise a much more active movement in a short time. One inquiry for 2400 tons, for No. 2 Birmingham, was the largest of the week. No especial movement has taken place in the demand from agricultural implement and wagon manufacturers, who, together with the stove and jobbing foundries, are reported to be pretty well stocked up, for the present at least. The quotations show no change from the recent past, except, perhaps, there is

less heard of \$10 sales of pig iron. That figure never has been a quotation, but there is little doubt that up to the present most of the dealers would have accepted it if embraced in a positive order. The quotations now may be regarded as \$10.25 to \$10.50 for No. 2 Birmingham. No change is to be noted in No. 2 Northern, Ironton, O., basis, nor in basic in which there has been absolutely nothing doing of late.

Coke.—The coke market remains on about the same basis as last week, the quotations being unchanged and the volume of business better. Among the contracts on coke reported during the week was one for 42 cars. The deliveries on specifications on contracts have kept up fairly well and the inquiries that are coming in show interest in both immediate delivery and last half. The spot figure for Virginia coke is \$2.25 for Virginia and \$2.25 to \$2.50 for Connellsville, best 72-hour selected for future deliveries. In this market, as in the pig iron market, there is a more decided optimism than even last week. Foundries are taking supplies well and increases in requirements are being looked for almost daily.

Finished Iron and Steel.—In the finished line orders have been coming in very freely during the past week, but the encouragement in the situation is on the aggregate of business and not on the size of the individual orders. The railroads are continuing their specifications for general materials, but the only order for rails of standard section for the week, of consequence, was one for 500 tons by a North Arkansas road. In light rails the lumber mills are doing practically nothing, but some inquiry is coming from the coal mines, which are showing signs of preparation for the fall business. In structural materials the orders the past week have been very good and the situation is much brighter. The fabricators are ordering for stock and quick shipment is demanded on all orders received. Contractors, too, are continuing to specify freely against contracts and they, also, are insisting on prompt delivery. Apparently the consumers are up against immediate requirements, but fortunately the mills continue in a position to meet the demands. In bars the agricultural specifications are fair, while the wagon manufacturers are making very liberal specifications. The variation between iron and steel is such as to favor the iron tonnage over steel orders. The market continues firm on the present basis, with a disposition to accept the quotations as the lowest likely to be made. Plates continue very quiet and there is practically nothing doing in the market in this division of the business. Track fastenings are in fair request, with a good volume of orders but none of large size. Generally the situation is to be regarded as much stronger. Buyers seem to be satisfied with the present conditions and anticipation of better orders from now on is general.

Old Material.—No change is apparent in the situation in scrap, with nothing of interest in the market beyond the speculative tendency of the dealers which has been noted previously. Later in the week the railroad lists are expected with no present indications of what they will embrace. A feeling of prospective activity, which is encouraging the market somewhat, is largely due to the better tone in the new material situation. Dealers' prices per gross ton, f.o.b. St. Louis, are as follows:

Old iron rails.....	\$12.50 to \$13.00
Old steel rails, rerolling.....	11.25 to 11.75
Old steel rails, less than 3 ft.....	10.25 to 10.75
Relaying rails, standard section, subject to inspection.....	23.00 to 23.50
Old car wheels.....	12.00 to 12.50
Heavy melting steel scrap.....	10.25 to 10.75
Frogs, switches and guards cut apart.....	10.25 to 10.75

The following quotations are per net ton:

Iron fish plates.....	\$10.25 to \$10.75
Iron car axles.....	18.00 to 18.50
Steel car axles.....	17.00 to 17.50
No. 1 railroad wrought.....	10.50 to 11.00
No. 2 railroad wrought.....	9.50 to 10.00
Railway springs.....	9.00 to 9.50
Locomotive tires, smooth.....	15.50 to 16.00
No. 1 dealers' forge.....	8.50 to 9.00
Mixed borings.....	4.50 to 5.00
No. 1 busheling.....	8.50 to 9.00
No. 1 boilers cut to sheets and rings.....	7.50 to 8.00
No. 1 cast scrap.....	9.50 to 10.00
Stove plate and light cast scrap.....	8.00 to 8.50
Railroad malleable.....	8.00 to 8.50
Agricultural malleable.....	7.00 to 7.50
Pipes and flues.....	7.25 to 7.75
Railroad sheet and tank scrap.....	7.25 to 7.75
Railroad grate bars.....	7.50 to 8.00
Machine shop turnings.....	6.00 to 6.50

THE IRON AND METAL MARKETS

Birmingham

BIRMINGHAM, ALA., June 26, 1911.

Pig Iron.—A considerably larger volume of business was transacted in this market the past week than in the week previous, but at the expense of market quotations. The sales that were effected involved in practically all cases a basis of \$10, Birmingham, for No. 2 Foundry. As to how much was sold at such figures specific information is lacking. It is estimated that from 5000 to 7500 tons was sold through local offices, consisting mainly of comparatively small lots for prompt delivery. The \$10 price is being quoted openly for prompt shipments and third quarter delivery by the majority of the producing interests, but without an established figure for deliveries covering the remainder of the year. Current rumors that a certain interest would accept shipments through the remainder of the year at the price asked for spot shipments are not given credence, although it is believed that considerable tonnage is available for that delivery at \$10.25. As far as can be ascertained, no figures whatever have been submitted on deliveries after January 1, notwithstanding the inquiries received. And it is a fact that those producers who practically withdrew from the market, even for spot shipments, when prices were lowered below a basis of \$11, still refuse to meet the market price and adhere to their former announced policy of suspending all operations after the delivery of tonnage on order-books that was sold at higher prices. The production has already been reduced during this month, and it is not thought that reports will show larger stocks on hand July 1 than were on hand June 1. One of the large producers now reports actual shipments as in excess of the daily output. The inquiries pending at this time are more attractive than for several weeks and indicate a disposition in some quarters to buy for speculative purposes. This last is probably the most encouraging development noted, although the general foundry trade is thought to have improved. An attractive tonnage of charcoal iron is pending, and the market for such iron is apparently very firm with the output of the furnaces in blast well taken care of. We revise our last quotations as follows, per gross ton, f.o.b. cars Birmingham furnaces:

No. 1 foundry and No. 1 soft.....	\$10.50
No. 2 foundry and No. 2 soft.....	10.00
No. 3 foundry	9.50
No. 4 foundry	9.25
Gray forge	9.00
Mottled	8.75
Standard basic, chill cast.....	10.25
Off basic	9.75
Charcoal car wheel iron.....	22.50

Old Material.—There has been no improvement in this market since last report. The movement to all mills is very light comparatively, and dealers' stocks are not being replenished readily owing to the narrow margins afforded. The market is only nominally represented by dealers' asking prices which are substantially as follows, per gross ton, f.o.b. cars here:

Old iron axles (light).....	\$13.50 to \$14.00
Old steel axles (light).....	12.50 to 13.50
Old iron rails.....	12.50 to 13.00
No. 1 railroad wrought.....	11.00 to 11.50
No. 2 railroad wrought.....	9.50 to 10.00
No. 1 country wrought.....	7.50 to 8.00
No. 2 country wrought.....	7.00 to 7.50
No. 1 machinery.....	9.50 to 10.50
No. 1 steel.....	8.50 to 9.00
Tram car wheels.....	8.00 to 8.50
Standard car wheels.....	9.50 to 10.50
Light cast and stove plate.....	7.00 to 7.50

Cast-iron Pipe.—The requirement of water pipe for the city of Muskogee, Okla., which amounted to 2600 tons, was placed with the United States Cast Iron Pipe & Foundry Company the past week. Of the tonnage placed the week previous for requirement at Colorado Springs, Colo., 1000 tons will be furnished by the American Cast Iron Pipe Company, which company was also awarded a contract for 1000 tons of water pipe by the city of Gadsden, Ala. In none of the lettings referred to is the price consideration made public, but it is understood that some concessions from the original bids were necessary. There has been no change in authorized quotations; but in view of the decline in pig iron prices it is quite probable that large contracts will now result in shading to a greater extent. The announcement that the plant of the Dimmick Pipe Company has been taken over by the United States Cast Iron Pipe & Foundry Company is an item of especial interest in local market conditions, although it is not known just when operations at that plant will be resumed. It is one of the largest in this district and

has been idle for some months. No recent additions have been made to the contracts in sight for early placing. We quote water pipe as follows, per net ton, f.o.b. cars here: 4 to 6 in., \$22; 8 to 12 in., \$21; over 12 in., average \$20, with \$1 per ton extra for gas pipe. These prices are no doubt subject to shading for large municipal contracts.

No. 2 Furnace of the Sloss-Sheffield Coal & Iron Company at North Birmingham, Ala., was blown out the past week.

New York

NEW YORK, June 28, 1911.

Pig Iron.—No general buying movement has followed the purchasing under cover by large consumers, to which reference was made last week. It appears evident that a considerable number of this class of buyers are becoming more impressed with the belief that prices are about as low as they can be expected to go in this particular period of trade recession, as less hesitation is observed in concluding negotiations when a definite decision has been reached as to the possible requirements of the near future. Yet there are not enough of them to make the market active. Sales agencies state that iron under contract is moving forward freely and that consumers are more frequently urging prompt shipments. Northern iron at tidewater is quoted as follows: No. 1 foundry, \$15.50 to \$15.75; No. 2 X, \$15 to \$15.50; No. 2 plain, \$14.50 to \$15. Southern No. 1 foundry is quoted at \$14.75 to \$15.25. No. 2, \$14.25 to \$14.75.

Finished Iron and Steel.—Business is still dull, with perhaps a slight improvement over last week, but the conditions are certainly promising if for no other reason than that nothing locally has turned up of a negative character. What improvement there is in prices of fabricated structural material has probably developed with those companies which have contracted for work in sufficient volume to keep them busy for some time. By next week it will probably be possible to note how general the advance in prices is. Railroad bridge work continues to be a substantial proportion of the new work coming into the market. The really large jobs are at this writing still in doubt and their settlement seems to be needed to give color to the present conditions. Government requirements for tugboats and colliers lend the needed spot of interest to business in plates. Of new large work pending is a 2500-ton building near the Grand Central station for the Adams Express Company; 1000 tons for pier sheds for the Delaware, Lackawanna & Western Railroad; 1400 tons for the Rotterdam Bridge of the Boston & Maine, the successful bidder for which is not known at this writing; 2500 tons for pier sheds for Norfolk asked by the Old Dominion Line, and 1200 tons for the Du Pont office building, Wilmington, Del., which an unverified report gives to the American Bridge Company. The Levering & Garrigues Company is to erect a 500-ton car-barn structure for the Third Avenue surface railroad and a 900-ton loft building on West Twenty-seventh street; the McClintic-Marshall Construction Company is to erect the 1200-ton power house in Brooklyn for the American Sugar Refining Company and a 450-ton bridge for the Atlantic Coast line. The American Bridge Company has, it is understood, received the following contracts: 4000 tons for the Baltimore & Ohio; 300 tons for the Boston & Maine, and 6000 tons for the new plant of the Crucible Steel Company of America. Other contracts reported are: 400 tons for the Boston elevated system to the Boston Bridge Company; 860 tons, Wheeling & Lake Erie to the King Bridge Company; 500 tons for stable for the Sheffield Farms-Slawson Decker Company, Brooklyn, N. Y., to W. E. Lyon Iron Works. Quotations are: Plain structural materials and plates, 1.51c. to 1.56c.; steel bars, 1.41c. to 1.46c.; bar iron, 1.30c. to 1.37½c., all New York. Plain material and plates from store, New York, 1.80c. to 1.90c.

Cast Iron Pipe.—The city of New York will open bids on two pipe-laying contracts June 28. One of these will require 1000 tons of water pipe and the other 800 tons. The city of Cleveland will open bids July 5 on 4000 tons. Some interesting export inquiries have been received. One of these calls for 3000 tons of large sizes, consisting mainly of 36 and 42-in. The general demand for pipe for private buyers has been quiet for some days. Carload lots of 6-in. are quoted at \$21 to \$22 per net ton, tidewater.

THE IRON AND METAL MARKETS

Old Material.—A better feeling is noted among dealers notwithstanding the fact that the volume of business continues light. A few small lots of steel scrap are changing hands, but quite a number of inquiries are coming out for cast-iron scrap from foundries. Some indications are also appearing of a possible demand for wrought scrap from rolling mills. Conditions continue exceedingly unsatisfactory as to deliveries on contracts, rejections being frequent of material which ordinarily would encounter no difficulty in acceptance by buyers. The next sale of Panama scrap is July 3, and will only consist of 149 tons, due to arrive June 28, at Pier 65, Hudson River, New York. Quotations are as follows per gross ton, New York and vicinity:

Old girder and T rail for melting.....	\$10.50 to \$11.00
Heavy melting steel scrap.....	10.50 to 11.00
Relaying rails.....	20.00 to 21.00
Recolling rails..... (nominal)	12.00 to 12.25
Standard hammered iron car axles.....	21.00 to 21.50
Old steel car axles.....	16.75 to 17.25
No. 1 railroad wrought.....	12.75 to 13.25
Wrought iron track scrap.....	12.00 to 12.50
No. 1 yard wrought, long.....	11.50 to 12.00
No. 1 yard wrought, short.....	10.00 to 10.50
Light iron.....	4.25 to 4.75
Cast borings.....	5.25 to 5.75
Wrought turning.....	6.25 to 6.75
Wrought pipe.....	9.50 to 10.00
Old car wheels.....	11.00 to 11.50
No. 1 heavy cast, broken up.....	11.00 to 11.50
Stove plate.....	8.50 to 9.00
Locomotive grate bars.....	8.50 to 9.00
Malleable cast.....	10.00 to 10.50

The German Iron Market

BERLIN, June 16, 1911.—The event of the week in the iron trade is the dissolution of the price convention covering wire, wire nails, and other wire products. The managers sent out a circular to the members several days ago announcing that the efforts to give firmer shape to the combination had failed; hence they could begin to take orders to-day at their own prices for deliveries after June 30. The convention was organized in January, 1909; its existence has therefore been slightly less than two years. The first consequence of its dissolution has been the break-up of the international wire convention, which is composed of German, Belgian, and other makers. The termination of the convention does not affect the wire rod association, which has a firm syndicate organization. The first effect of the break-up of the wire convention will be a sharp fall in prices; a reduction of 20 marks is expected to follow at once. Consumers have been holding back with orders in a striking way while the organization was in its last throes, but it is expected that they will buy more freely at the reduced prices. The nominal price of drawn wire for the current quarter was 147.50 to 152.50 marks; 177.50 to 182.50 for galvanized, and 165.50 to 167.50 for wire nails; but these prices have not been strictly observed of late. In fact, there has been considerable price-cutting in a quiet way.

Another trade combination that is in a bad way is the rivet association. According to the latest information it is expected to break up September 30, unless the members succeed meanwhile in forming a syndicate, with power to assign allotments; but the prospect that this latter will be accomplished is very slight. Meanwhile prices are often cut in this line also.

This week a further cut in bands to 127.50 to 130 marks is announced, which means a drop of 2.50 marks. In the general market, it may be said, the price tendency is somewhat weaker, and it is not expected that an improvement will take place in view of conditions in the foreign markets.

The negotiations for the rounding out of the Essen Pig Iron Syndicate to include all the furnaces of the country are at a standstill for the present, but they are to be resumed next week. The prospects for a positive result have grown rather worse this month; the market reports continue to mention fresh difficulties. The make of pig iron in May reached 1,312,000 metric tons, or about 10,000 tons less than the record production. The month's production was 27,000 tons more than for April, and 50,000 tons more than for May, 1910.

The shipments of the Steel Works Union of rails, structural shapes and billets in May were even greater than the preliminary figures quoted in last week's letter. The actual total reached 532,350 tons, or 7,000 tons above the figures first given out.

This week the news from the Belgian market is again bad. The steel combination of the country has

given out its prices for steel material for the next quarter. These are nominally unchanged; but as a rebate of 1.50 francs the ton is introduced, the actual result is a small reduction in prices. Belgian letters in the German trade press this week describe conditions there as very unsatisfactory. Competition, it is said, has caused prices to sink to a level where little or no profit can be earned. Soft steel bars for export have fallen to 90 shillings, f.o.b. Antwerp, and iron bars are only one shilling higher.

Business in the German hardware trade has begun to show the effects of the weak and hesitating movement in the iron trade. The shops are mostly still well employed and some of them are crowded with work; but buyers are slower in placing new orders. In not a few sections of the trade, too, heavy overproduction is complained of. The demand for builders' hardware continues very brisk in view of the activity in building operations, and in some lines prices have been marked up. Shops turning out parts for bicycles and autocars are very busy; some are working overtime. Machine-tool shops are irregularly employed. Prices have been so severely cut in the export trade that this outlet for the product has about ceased to look attractive. Consumers are very slow in ordering goods. Screw and rivet makers have not sufficient orders to keep them busy and there is considerable price cutting.

Metal Market

NEW YORK, June 28, 1911.

The Week's Prices

Cents Per Pound for Early Delivery.							
Copper, New York.		Tin.		Lead.		Spelter.	
June.	Lake.	Electro-lytic.	New York.	New York.	St. Louis.	New York.	St. Louis.
22.....	12.60	12.80	45.00	4.50	4.35	5.70	5.50
23.....	12.62½	12.87½	45.00	4.50	4.35	5.70	5.50
24.....	12.62½	12.87½	....	4.50	4.35	5.65	5.45
26.....	12.62½	12.87½	45.40	4.50	4.35	5.65	5.45
27.....	12.62½	12.87½	45.35	4.50	4.35	5.65	5.45
28.....	12.62½	12.87½	45.00	4.50	4.35	5.65	5.45

Copper is higher than it was a week ago but the market showed signs of sagging this morning. Pig tin is in scant supply and has advanced slightly. Lead is firm but dull. Spelter has receded somewhat.

Copper.—It is apparent that the copper market has been subjected to some manipulation and while consumers have bought rather freely it is claimed that some of them were frightened into the market by steadily advancing prices. A week ago electrolytic copper was sold in New York at 12.50c. and consumers seem to think that a fair price although ten days before it could be had at ¼c. less. Within the last few days attempts were made by prominent sellers to force the market up and they succeeded in getting as high at 12.70c. in some instances for electrolytic copper for July and August delivery. Many large buyers who had been inquiring for a liberal amount of copper took the stand that the upward movement was a speculative one and they refused to place orders with the result that yesterday afternoon and this morning some good quantities of copper were offered at resale at a materially lower price. The market has been irregular all week but buyers who are familiar with the situation were able to buy electrolytic copper at 12.62½c. and lake at 12.87½. The London market has not responded to the advance here, but this is largely due to the holiday festivities there which interfered with business greatly. Exports of copper have been large, amounting so far this month to 25,548 tons. In London this morning the market was easy and spot copper was offered at £56 18s. 9d. and futures at £57 10s.

Pig Tin.—A decided scarcity of spot supplies of pig tin exists here with the result that the market advanced slightly during the week. The cessation of business in London, due to the coronation, resulted in prices being largely nominal there as the sales of the week were very light. In consequence this market has been going it alone and London quotations have had little effect on the domestic situation. So far this month only 1997 tons of pig tin arrived in this port, of which 250 tons were shipped back early in the month by the leading consumer here. This shipment was made for its moral effect on the English market, or rather to intimidate the syndicate operators who were forcing the market upward. Few sales were made here during the week and while no attempt has been made to corner the spot supplies the available tin is not very well distributed. Anything like a buying movement would probably bring out the speculative element.

THE IRON AND METAL MARKETS

Quotations seem to be largely nominal and this morning the metal could be bought for 45c., which is 35 points less than the price made yesterday. In London this morning spot tin was sold for £195 10s. and futures for £190 10s. The market was weak.

Tin Plates.—An encouraging demand for domestic tin plates has developed, and it comes largely from small manufacturers who are buying to replenish their depleted stocks. Quotations are unchanged at \$3.94 for 100-lb. coke plates. The market in foreign tin plates has not declined in sympathy with the pig tin market, but remains at 14s. for plates at Swansea, Wales.

Lead.—Lead is firm but dull. It is the general impression that the recent advance was in sympathy with the upward movement in the copper market, but outside sellers are meeting the price made by the leading interests, and they show no signs of offering concessions as has been their custom during the last six months. The price in New York is 4.50c., and the metal is sold in St. Louis at 4.35c. Some special brands are bringing more.

Spelter.—The spelter market is slightly weaker, which is due largely to the fact that consumers who were buying heavily have apparently filled their needs. The market is very uncertain, and is hard to quote as resale lots frequently appear while concessions are freely made. Sellers in many instances seem to lack confidence in the strength the market has shown, and even when consumers are inquiring for good sized lots they show an anxiety to dispose of their holdings. The market this morning was 6.55c. New York, and 5.45c. St. Louis.

Antimony.—The antimony market seems to have gotten back to the point it was before the syndicate was formed, and prices are steadily going downward. Buyers are showing some interest in futures, but they seem to be well supplied with stocks at present. The expected cut in Cookson's was made during the week and it is now freely offered at 8.50c. Hallett's can be had at 8.25c., and Chinese and Hungarian grades from 7.25c. to 7.30c. Hallett's has been freely offered in this market for July and August delivery at as low as 7.75c.

Old Metals.—Consumers are not actively in the market but dealers' selling prices, New York, are firmly held, as follows:

	Cents.
Copper, heavy cut and crucible.....	12.00 to 12.25
Copper, heavy and wire.....	11.50 to 11.75
Copper, light and bottoms.....	10.75 to 11.00
Brass, heavy.....	8.00 to 8.25
Brass, light.....	6.75 to 7.00
Heavy machine composition.....	10.50 to 10.75
Composition turnings.....	8.75 to 9.00
Clean brass turnings.....	8.00 to 8.25
Lead, heavy.....	4.20 to 4.25
Lead, tea.....	3.95 to 4.00
Zinc, scrap.....	4.25 to 4.30

Chicago

JUNE 27.—The demand for metals in the past week was somewhat less active than in the week preceding. Most of the interest was centered in copper. A slight advance in zinc was recorded, while the long continued dullness with reference to antimony resulted in a weakening of prices. We quote Chicago prices as follows: Casting copper, 12.75c.; lake, 13.00c., in carloads, for prompt shipment; small lots, 1/4c. to 3/8c. higher; pig tin, carloads, 46c.; small lots, 49c.; lead, desilverized, 4.45c. to 4.50c. for 50-ton lots; corroding, 4.70c. to 4.75c. for 50-ton lots; in carloads, 2 1/4c. per 100 lb. higher; spelter, 5.70c. to 5.75c.; Cookson's antimony, 9 1/2c., and other grades, 8 1/2c. to 9c., in small lots; sheet zinc is \$7.50 f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote for less than carload lots: Copper wire, crucible shapes, 12 1/2c.; copper bottoms, 10 1/4c.; copper clips, 12c.; red brass, 10 1/2c.; yellow brass, 9 1/4c.; lead pipe, 4 3/8c.; zinc, 4 1/4c.; pewter, No. 1, 27c.; tin foil, 35c.; block tin pipe, 39c.

St. Louis

JUNE 27.—The metal market, especially in lead and spelter, is showing decided activity. Every day for the past week there has been a higher price for spelter, and it is ruling now at 5.60c. to 5.65c., East St. Louis, with an active and strong tendency. The demand is exceedingly large. In pig lead, prices show an advance, the quotations being 4.35c. to 4.40c., East St. Louis, and strong at that. At Joplin the price of zinc ore has advanced, standing at \$42, with the added statement that the surplus in the bins has been reduced from 12,000 tons to 5,000 tons in the past week. Tin is a

bit better than last week, at 45.85c.; antimony is lower, at 8.85c.; Lake Copper is 13.10c., and electrolytic copper 13c., both being advances. For old metals the prices are: Light brass, 5c.; heavy brass and light copper, 8c.; heavy copper and copper wire, 9c.; zinc, 3c.; lead, 3.35c.; pewter, 20c.; tin foil, 30c.; tea lead, 3c.

Notes on Prices

Rope.—The hard fiber market is firm and if the demand for cordage was more active the lower grades would show increased strength. The following quotations represent regular prices to the retail trade in the Eastern market for rope, 7/16 in. in diameter and larger, with card advances for smaller sizes: Pure manila of the highest grade, 8 1/2c. to 9c. per lb.; second grade manila, 7 1/2c. to 8c. per lb.; hardware grade manila, 7c. to 7 1/2c. per lb.; pure sisal of the highest grade, 6 1/4c. per lb.; second grade, 6c. per lb.; rove jute rope, 1/4 in. and up; No. 1, 6 1/2c. to 7c. per lb.; No. 2, 6c. per lb.

White Lead in Oil.—During the first half of June there was a seasonable demand of a jobbing character, outside of regular contract deliveries. For the last two weeks of the month less activity in buying has been noticed, but prices have been maintained at unchanged quotations, as follows: Lots of 500 lb. and over, 7 1/4c. in 100, 250 and 500-lb. kegs; 7 1/2c. in 25 and 50-lb. kegs. In lots of less than 500 lb. the usual advance of 1/2c. is charged.

Linseed Oil.—The country will enter the fall bare of flaxseed, as the world's supply is about exhausted. It is the opinion of some in oil circles that while prices may decline during July on crop prospects there will be a scramble for oil in September, with higher prices. On the basis of raw, linseed oil in carload lots is obtainable at 84c. to 85c. per gal. Buying, even from manufacturing consumers, is for small lots, but they ask for prompt delivery on contract orders. No change has been made in card prices, but the following prices, in New York, are made for five-barrel lots:

	Cents.
State raw.....	87
City, raw.....	88
Oil, in lots of less than 5 bbl., 1 cent advance per gallon.	
Boiled oil, 1 cent advance per gallon over raw.	

Naval Stores.—The turpentine market is stronger, owing to more demand in Savannah, which is reflected in this market, where more liberal orders are being placed by manufacturing consumers. New York quotations are as follows:

	Cents.
In oil barrels.....	56 1/2
In machine barrels.....	57
Less than 5-bbl. lots, 1/2 cent advance per gallon.	

Buying of rosins has been moderately active in this market, but chiefly in jobbing lots. On the basis of 280 lb. to the barrel common to good is quoted at \$6.40 and grade D \$7.05 in the New York market.

A New Sharon Band Mill

The Sharon Steel Hoop Company, Sharon, Pa., is completing a 14-in. mill for rolling wide bands and strips from 4 1/2 in. to 15 in. wide and from about 18 gauge in the narrower widths down to 13 gauge in the wider widths and heavier up to 3/8 in. thick. The mill is an 18-in. tandem roughing and 14-in. finishing. It is equipped with a Laughlin continuous heating furnace and a mechanical hot bed, and in the most favorable sizes will roll to 125-ft. lengths. The company has erected a new electrical power house equipped with two 500-kw. generators built by the General Electric Company and driven by Hamilton-Corliss engines. These generators will furnish power for running the motors, the mill being electrically driven throughout. The fuel used will be producer gas from three Bradley producers. The building is covered by a traveling electric crane with an 82-ft. bridge. It is expected that the mill will be in operation in a week or two.

The Stephenson Charcoal Iron Company will build a blast furnace plant at Wells, Mich., and Frank C. Roberts & Co., Philadelphia, are the engineers.

Iron and Industrial Stocks

NEW YORK, June 28, 1911.

Stocks experienced a recession on Thursday when news of additional investigations by the Government became public, but this adverse influence was completely overcome on Saturday when the Union Pacific and Southern Pacific merger was judicially declared valid. After the announcement of this decision stocks advanced to considerably higher figures. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chalm., pref... 29½-30¾	Pressed St., com.... 36 - 37¾
Beth. Steel, com.... 33 - 33¾	Pressed St., pref.... 101 - 102
Beth. Steel, pref... 62 - 62½	Railway Spr., com... 37 - 48¾
Can, com..... 10¾-11	Railway Spr., pref.... 102
Can, pref..... 85¾-86	Republic, com.... 30¾-30¾
Car & Fdry, com... 56 - 57¾	Republic, pref..... 93¾-93¾
Car & Fdry, pref.... 117	Pipe, com..... 17½
Steel Foundries... 41 - 41¾	Pipe, pref..... 57½-57½
Colorado Fuel.... 34¾-35	U. S. Steel, com.... 77¾-79¾
General Electric... 162 - 164¾	U. S. Steel, pref.... 118 - 118¾
Gr. N. Ore Cert... 61 - 62½	Westinghouse Elec... 75¾-76¾
Int. Harv., com.... 120½-123	Va. I. C. & C..... 71 - 72
Int. Harv., pref... 123 - 124½	Am. Ship, com.... 67 - 68½
Int. Pump, com.... 41½-42½	Chi. Pneu. Tool.... 51 - 52
Int. Pump, pref.... 89 - 89¾	Cambria Steel..... 44¾-45
Locomotive, com... 41¾-42¾	Lake Sup. Corp.... 26¾-27
Locomotive, pref... 109	Crucible St., com... 13 - 13¾
Nat. En. & St., com 16¾-18	Crucible St., pref... 82 - 82½
Nat. En. & St., pref..... 92	Harb. Wk. Ref., pref. 97 - 98

Dividends

The American Shipbuilding Company, regular quarterly, 1¼ per cent. on the preferred, payable July 15.

The Union Twist Drill Company, quarterly, 3 per cent. on the common and 3 per cent. on the preferred, payable July 1.

Manning, Maxwell & Moore, regular quarterly, 1½ per cent., payable June 30.

The Gorham Mfg. Company, regular quarterly, 1½ per cent. on the preferred, payable July 1.

The Pope Mfg. Company, regular quarterly, 1½ per cent. on the preferred, payable July 31.

The American Seeding Machine Company, regular quarterly, 1½ per cent. on the preferred, and regular quarterly, 1 per cent., and extra, ½ per cent. on the common, payable July 15.

The Union Switch & Signal Company, Pittsburgh, quarterly, 3 per cent. on the common and 3 per cent. on the preferred, payable July 10.

The Westinghouse Air Brake Company, Pittsburgh, regular quarterly, 2½ per cent., and extra, 1½ per cent., and special 1 per cent., payable July 10.

The New York Air Brake Company, regular quarterly, 1½ per cent., payable July 28.

The American Screw Company, 2½ per cent., payable June 30.

The Sharon Steel Hoop Company, Sharon, Pa., 1¾ per cent., payable July 1.

Belgian Iron and Steel Production in 1910

Iron and steel production in Belgium for the first ten years of the century has been reported by H. de Nimal, secretary of the Association des Maîtres de Forges de Charleroi. The production of pig iron in 1910 was 1,852,090 metric tons (2,204.6 lb.), an increase of 142.36 per cent. over the production of 1901. Of the total amount of ore involved in the production in 1910, Belgium furnished only 1.66 per cent. While production has increased for the 10-year period, importation has likewise increased, the total consumption of 1910 being 177.89 per cent. greater than the consumption of 1901. Year in and year out the importation of pig iron has been about one-quarter of the total consumption. The total production of rolled steel in 1910 was 1,155,740 metric tons and of cast steel 52,665 tons. The combined production of steel in 1910 was 321.71 per cent. greater than in 1901.

Henry R. Merton & Co., Ltd., London, England, report another decrease in the stock of copper in England and France and afloat thereto. This stock June 15 was 70,416 gross tons, against 72,613 tons May 31. The reduction in European stock has been continuous since January 30, 1910, when the maximum, 110,868 tons, was reached. The combined visible supply of America, England and France May 31 was 146,718 tons, against 151,977 tons April 29.

The entire 14 sheet mills in the plant of the Youngstown Sheet & Tube Company, East Youngstown, Ohio, resumed operations June 19, with fair prospects for a steady run.

Personal

Major Joseph T. Speer, president of the Pittsburgh Valve, Foundry & Construction Company, who was re-elected president of the American Foundrymen's Association at the convention held in Pittsburgh in May, recently gave a dinner at the Hotel Anderson, Pittsburgh, to the members of the executive committee of the Pittsburgh Foundrymen's Association, and who had charge of the convention entertainment. Those who attended the dinner were as follows: J. S. Seaman, Seaman-Sleeth Company; F. H. Zimmers, Union Foundry & Machine Company; H. E. Field, Mackintosh, Hemphill & Co.; W. A. Bole, Westinghouse Air Brake Company; E. D. Frohman, S. Obermayer & Co.; Eliot A. Kebler, M. A. Hanna & Co., and G. P. Bassett, Jr.

Charles Frederick Booker, Ansonia, Conn., president of the American Brass Company, was given the honorary degree of master of arts by Yale University at the commencement exercises last week.

Frank G. Payson, for the past six years traveling mechanical expert for the Niles-Bement-Pond Company, New York City, has accepted the position of Western representative for the Union Petroleum Company, Philadelphia, Pa. (mineral lard oil exclusively), with headquarters at Chicago, Ill.

Frederick Bucher, formerly general small tool supervisor of the American Locomotive Company, has accepted a position as demonstrator for the mineral lard oil department of the Union Petroleum Company, Philadelphia, Pa.

B. F. Fackenthal, Jr., president of the Thomas Iron Company, Hokendauqua, Pa., received the degree of science from Lafayette College June 21.

Willis L. King, vice-president of the Jones & Laughlin Steel Company, Pittsburgh, sailed for Europe last week with his family and will be gone several months.

Col. R. C. McKinney, president of the Niles-Bement-Pond Company, returned to New York on the new steamship Olympic June 21, after a three months' pleasure trip, during which he motored through Europe and visited Egypt.

Obituary

E. R. EVINGER, superintendent of the Miami Valley Machine Tool Company, Dayton, Ohio, died June 19 at the Marion, Ohio, Sanitarium, after an illness of about six months, aged 37 years. He leaves a widow and three children.

FREDERICK NESBITT of the Easton Foundry & Machine Company, Easton, Pa., died suddenly June 24, aged 35 years. He was born in Wilkes-Barre, Pa., was graduated from Lafayette College in 1896, and in the week of his death was one of the principal participants in the reunion of his class at the college. He leaves a widow and one child.

Another Ore-Washing Plant in Minnesota.—An important project on the Mesaba range is the construction of an ore-washing plant by the International Harvester Company, Chicago. It is the understanding that the installation of this concentrating process will represent an expenditure of \$600,000. The plant will be patterned after that of the Oliver Iron Mining Company (United States Steel Corporation) at Coleraine. It will occupy a site at O'Brien Lake, at the western end of the range, in the vicinity of which the company has acquired a large tract of land from the State. The plant primarily is for the purpose of treating ore from the Hawkins mine at Nashauk. Much of the Hawkins deposit is impregnated with sand. It is of comparatively small value as it lies in the ground, and, besides, its presence is not conducive to the most satisfactory mining operations. With the washery in commission the mine will be in a position to produce steadily and at materially larger volume than heretofore.

It is probable that two of the Duquesne furnaces of the Carnegie Steel Company at Duquesne, Pa., which have been out of blast for some time, will be blown in within the next two weeks.

Navy Tool Steel

Revised Specifications for United States Navy

Several months ago the Navy Department ordered a board of officers to consider the revision of the specifications for high-speed tool steel and to complete the work of the former board in writing specifications for carbon tool steel. The report of the former board and the specifications adopted at that time were printed in these columns. Since then, considerable quantities of high-speed tool steel have been purchased under these specifications for the navy yards, and particularly for use at the Naval Gun Factory at Washington. The results were in general satisfactory, and high-speed tool steel of excellent quality has been received at prices ranging about 42 cents per lb.

The experience gained in testing these steels and in using the tools made from them by the Central Tool Plant at the Philadelphia Navy Yard has shown the necessity for revision of certain of the requirements. The changes in the high-speed steel specifications generally are of a minor character, and consist in the addition of certain requirements as to methods of inspection, test and delivery. There is added also in the revised specifications a statement of the general purposes for which each grade of tool steel is intended. The specifications for carbon steel follow fairly closely the classification defined by the former board, but are somewhat more elaborate.

In its report the board reported that the various navy yards were not obtaining the best results from the use of the high-speed steel tools supplied from the Philadelphia Navy Yard, due in a great measure to the delays in obtaining them when desired, and to the requirement under the present arrangement that, when worn, tools be returned to Philadelphia for retreating and redressing. In view of this the board recommended that the installation be authorized, at each of the principal yards, of a treating and dressing plant for high-speed steel tools. This plant is not to be elaborate and is not intended for the manufacture of high-speed steel tools, but is to be only sufficiently large to permit reforming and treating tools received from the Philadelphia Navy Yard when they become worn in use.

The specifications recommended by the board are as follows:

Chemical Composition

Tungsten Steel

	Class 1. Per cent. limits.	Class 2. Per cent. limits.
Carbon	0.75 to 0.55	1.50 to 1.35
Chromium	5.00 to 2.50	Optional
Manganese	0.30 to 0.05	0.20 to 0.10
Phosphorus	0.015 to 0.00	0.015 to 0.00
Silicon	0.30 to 0.00	0.20 to 0.00
Sulphur	0.02 to 0.00	0.02 to 0.00
Tungsten	20.00 to 16.00	5.00 to 2.00
Vanadium	0.00 to 0.35	Optional
Iron	Remainder	Remainder

Carbon Steel.

	Class 1. Per cent. limit.	Class 2. Per cent. limit.	Class 3. Per cent. limit.	Class 4. Per cent. limit.
Carbon	1.25 to 1.15	1.15 to 1.05	0.95 to 0.85	0.85 to 0.75
Chromium	Optional	Optional	Optional	Optional
Manganese	0.35 to 0.15	0.35 to 0.15	0.35 to 0.15	0.35 to 0.15
Phosphorus	0.015 to 0.00	0.015 to 0.00	0.02 to 0.00	0.02 to 0.00
Silicon	0.40 to 0.10	0.40 to 0.10	0.40 to 0.10	0.40 to 0.10
Sulphur	0.02 to 0.00	0.02 to 0.00	0.02 to 0.00	0.25 to 0.00
Vanadium	Optional	Optional	Optional	Optional
Iron	Remainder	Remainder	Remainder	Remainder

Method of Manufacture and Physical Requirements

The tool steel shall be made in either the electric or crucible furnace. The bars must be forged or rolled accurately to the dimensions specified; to be free from seams, checks and other physical defects and be of homogeneous composition.

The tungsten steels will be delivered unannealed unless otherwise specified and the carbon steels will be delivered annealed unless otherwise specified. The bars will be delivered in commercial lengths and short pieces will not be accepted unless so specified.

Stamps on Material.—The contractor shall stamp on each bar or piece of steel his name, the trade name of the steel which he is furnishing and the kind of steel and class as given in this specification. If the bars are longer than about three (3) ft., the above stamps will be placed at intervals of about three (3) ft. along the bar.

Delivery of Material.—All material will be delivered to the General Storekeeper, Building No. 4, Navy Yard, Philadelphia, Pa. Lots of material less than 1000 lb. will be delivered in one shipment, and in general all material will be delivered in one shipment, if practicable.

Acceptance Tests.—Samples for acceptance test will be taken from the material delivered to the General Storekeeper, Navy Yard, Philadelphia, Pa., or if the material is inspected at the place of manufacture, the Inspector of Engineering Material will forward samples as called for under the heading "Samples Furnished by Bidder" to the General Storekeeper, Navy Yard, Philadelphia, Pa., who will

forward them to the engineer officer. The engineer officer will arrange for the tests, both chemical and physical, required by these specifications and recommend the acceptance or rejection of the material.

Rejection.—If the material is not equivalent to the sample furnished with bid, it will be considered sufficient cause for rejection. The contractor shall replace the shipment within two weeks, if practicable, after the receipt of notice of rejection.

Physical Tests

Tungsten Steel

Class 1.—The sample bar will be forged into five tools, treated and ground to the No. 30 form of the Sellers system of tool forms. Each tool will be tested on nickel-steel forging of about 100,000 lb. tensile strength with a cut $\frac{1}{4}$ in. deep, $1/16$ in. feed and a cutting speed of 50 ft. per minute. The tool will be twice reground and retested. A record will be made of the length of time the tool cuts, without a lubricant or cutting compound, before it is ruined.

*From the sample bar $3\frac{3}{4}$ in. round two butt mills $3\frac{3}{4}$ in. diameter will be made and tested on a nickel-steel block, with cut 0.20 in. deep, $1\frac{1}{2}$ in. wide, feed 0.04 in. per revolution of mill, at a speed of 100 ft. per minute. Each mill to run at least 40 in. and be in fair condition at end of run. Lubricant to be used.

Class 2.—The bar will be forged into five tools, treated and ground to the No. 22 form of Sellers system of tool forms. Each tool will be tested on a carbon, open-hearth steel forging of about 60,000 lb. tensile strength with a cut of $1/32$ in. deep, $\frac{1}{8}$ in. feed, and a cutting speed of about 50 ft. per minute. A record will be made of the length of time the tool cuts, with a lubricant or cutting compound, before it is ruined.

*From the $\frac{3}{4}$ in. x $1\frac{1}{2}$ in. sample bar, three standard round nose roughing tools are to be made and tested on nickel-steel forging with a $\frac{1}{4}$ -in. cut, feed 0.05 in. per revolution, and a speed of 15 ft. per minute. Each tool should run for 20 minutes without serious injury, without a lubricant.

Carbon Steel.

Class 1.—Machinists' taps $\frac{3}{8}$ in. diameter will be made and tested on nickel steel. A record will be made of the number of holes tapped before the tap is ruined. A lubricant will be used, and the r.p.m. of the tap will be varied to suit conditions.

*From the $2\frac{1}{4}$ -in. square sample bar, three finishing tools will be made and tested on a nickel-steel forging with a cut from 0.001 in. to 0.003 in. deep, a feed $2\frac{1}{4}$ in. per revolution, and a speed of 8 ft. per minute. Each tool should make a clean smooth finish for a run of at least 20 ft., without lubrication.

Class 2.—One 1-in. end mill will be made and tested with a lubricant, by cutting a piece of class O carbon steel. The depth of cut will be $1/16$ in., the r.p.m. will be varied to suit conditions, and a record will be made of the length of time the mill cuts before it is ruined.

*From the sample bar $1\frac{1}{4}$ in. round one end mill $1\frac{1}{4}$ in. diameter will be made and tested on mild steel block, cut 0.20 in. deep, 0.50 in. wide, feed 0.018 in. per revolution, at a speed of 40 ft. per minute. The mill should run at least 40 in. and be in fair condition at the end of run. Lubricant to be used.

Class 3.—Pneumatic cape chisels $\frac{1}{2}$ in. will be made and tested with a lubricant on nickel steel. A record will be made of the distance the tool cuts before it is ruined.

Class 4.—Rivet sets $\frac{1}{2}$ in. will be made and tested and a record will be made of the number of rivets the set will drive before it is ruined.

Modification of Tests.—Any or all the above tests may be modified at the discretion of the engineer officer.

Samples Furnished by Bidders.—Each bidder shall furnish with his bid one bar of steel as follows:

Tungsten:

Class 1— $\frac{3}{4}$ in. x $1\frac{1}{2}$ in. x 5 ft. long.

*Class 1— $3\frac{3}{4}$ in. round x 24 in. long.

Class 2— $\frac{3}{4}$ in. x $1\frac{1}{2}$ in. x 5 ft. long.

Carbon:

Class 1— $\frac{1}{2}$ in. diameter rod, 2 ft. long.

*Class 1— $2\frac{1}{4}$ in. square x 6 ft. long.

Class 2— $1\frac{1}{2}$ in. diameter rod, 2 ft. long.

*Class 2— $1\frac{1}{2}$ in. round, 24 in. long.

Class 3— $\frac{3}{4}$ in. octagon rod, 5 ft. long.

Class 4—2 in. diameter rod, 2 ft. long.

All samples must be delivered, unless otherwise specified in the proposal, to the General Storekeeper, Building No. 4, Navy Yard, Philadelphia, Pa., at or before the time set for the opening of the bids. Failure to comply with this requirement will eliminate the bid from consideration. The sample bar will be delivered by the General Storekeeper to the engineer officer for him to direct the selective tests.

Treatment of Samples.—Each bidder must state, in his bid, the treatment to which the material is to be subjected, in order to get, in his opinion, the best results.

Recommendation of Award.—The right is reserved to reject any or all bids. Failure to comply with all the requirements will eliminate the bid from consideration. The engineer officer will, after the prescribed tests have been made, recommend the award for contract for the steel or steels which, in his opinion, it is to the best interest of the government to purchase, due consideration being given to the cost of the material. The relation of the physical test and the price of the material will be the basis for selection.

Alternate Proposals.—Bidders may submit proposals on steel which differs from the composition specified, provided this is clearly stated in their bid and provided they furnish the engineer officer with the exact chemical composition of the material. This information will be considered confidential by the engineer officer if the bidder requests it. The material will be tested if, in the opinion of the engineer officer, it is considered suitable for the purpose intended.

Defective Material.—If material, when being manufactured into tools, develops physical defects, which could not be detected by inspectors, such as "cracks," "pipes," etc., the manufacturer of this steel shall replace, without cost to the government, such defective material.

Purpose for Which the Steel Is Intended.

Tungsten Steel

Class 1.—Lathe and planer tools, milling machine tools, etc., and in general all tools for which high speed steel is used.

Class 2.—Lathe and planer tools, and in general tools for finishing purposes, either steel or brass.

*The requirements indicated by asterisk apply only to tool steel required for delivery to the Navy Yard, Washington, D. C.

Carbon Steel.

Class 1.—Lathe and planer tools, drills, taps, reamers, screw cutting dies, taps and tools requiring keen cutting edge combined with great hardness.

Class 2.—Milling cutters, mandrels, trimmer dies, threading dies, and general machine shop tools requiring a keen cutting edge combined with hardness.

Class 3.—Pneumatic chisels, punches, shear blades, etc., and in general tools requiring hard surface with considerable tenacity.

Class 4.—Rivet sets, hammers, cupping tools, smith tools, hot drop forge dies, etc., and in general tools which require great toughness, combined with the necessary hardness.

It may be said that the experience of over two years in the purchase under specifications of tool steel for the navy has been satisfactory in every particular, not only from the point of view of the government, but also of the manufacturer. The various manufacturers have been placed on equal basis, and the contracts have been awarded in all cases to the lowest bidder offering satisfactory steel. The possibility of preference of one maker over another has been eliminated, and the various navy yard foremen no longer are subjected to influences from agents representing one or another tool steel maker.

All steel received is of uniform quality and, what is of the utmost importance, responds to the same treatment. Under the former system, when different brands were purchased, as soon as a tool lost its identity there remained no method by which the tool dresser could ascertain the correct treatment to give it, so that the results obtained after the first treatment became largely a matter of chance. What is also an important consideration is the material reduction in prices that has been effected by introducing direct competition in the purchases.

Ore Mining on the Great Northern Properties

DULUTH, MINN., June 24, 1911.—The Oliver Iron Mining Company (United States Steel Corporation) now has eight properties opened on lands secured by it from the Great Northern Railway, under the famous "Great Northern lease." These are sure to be very large shippers the present year, and it is likely that two or three of them will go well above the million-ton point for the season. At the commencement of 1911, Steel Corporation deficiencies in requirements under the terms of the Great Northern lease amounted to more than 5,000,000 tons, while the minimum for the present season is 3,750,000 tons, as is well known. If the year is to end with the minimums met and all deficiencies cleaned up that have accrued since the inauguration of the lease, it will mean the mining of about 9,000,000 tons from Great Northern lands this summer, and it is now realized that this is impossible. The corporation, therefore, will not be up with its contract before the close of 1912.

The increase of 750,000 tons a year in minimums under this lease is a tremendous figure, and means herculean work on the part of the Oliver Company in mining and the Great Northern in transporting ore to the lake. These minimums for 1912 amount to 4,250,000 tons, which, added to the deficiency of the beginning of this year, makes a total amount of ore to be moved in the two years of over 14,000,000 tons. This being the fact, it seems as though the Great Northern Railway would continue for some time the chief shipper of the Lake Superior country, a position that it is sure to take this year for the first time.

The Steel Corporation has such a tremendous aggregate of annual minimums from other lands than those under the Great Northern lease that the question of caring for these tonnages is doubtless a very interesting problem for its ore officials. The fact that some of these leases are approaching their termination, while they have still a large amount of ore unrecovered, will add to the intricacies of the problem, for it is no secret that leases made at 25 and 30 cents a ton are not liable to be renewed at any such figure. Especially is this the case with such an example of higher rates before owners as Mr. Hill's lease presents.

James R. Finlay, a well-known mining engineer, of New York City, who has undertaken the task of valuing the mines of Michigan for the State Tax Commission has begun operations, and has established an office at Houghton, where he has already gathered a corps of assistants for the work. He is to make his report in August, and has some 160 mines to examine and value before that time. The task is of such magnitude and intricacy that

it was difficult for the state to secure an engineer who was willing to undertake it and promise completion by the time set. Of course, it will be impossible to make a complete examination of so many mines. A large number, however, are idle and filled with water. Their value, whatever it may be, must be determined from records of the companies and interested persons. Once secured, it will be possible, by some such system of annual reports as the Minnesota Tax Commission requires of mining companies in that state, to maintain it at a high degree of timeliness.

Cuyuna range explorations are spreading toward the southwest, where distinct lines of attraction have been noted. In Morrison County, Minnesota, some miles north and east from the city of Little Falls, and a long way from any discovered mines, exploration is now going on. It is not understood that any iron of value has been found or that the developments there have been especially flattering, except to those who have gained possession of acres at some low prices and are selling at an advance. The mere presence of a dip needle attraction seems enough to set explorations in motion and to boost the price of lands. But lines of attraction to the magnetic needle are about the commonest things in northern Minnesota, except mosquitoes.

D. E. W.

Capabilities of the Molding Machine

The day is coming, and coming very fast, when the molder will be called upon to look more after the art, and the machines will do the laborious part of the work; then he will be looked upon as a thorough mechanic and be given a greater measure of respect than has been the case in the past. Such is the prophetic statement made by John Alexander, Philadelphia, Pa., in a paper on "Machine versus Hand Molding" read before the American Foundrymen's Association at its recent meeting in Pittsburgh. The jarring machine he believes will be the machine of the future for general work.

The molding machine, he considers, has raised the standard of foundry practice to a great extent by the better all around quality of the castings made. Castings are more near uniform to pattern, at least from 10 to 15 per cent. in their weight is saved; in fact, it is only a short time ago, he mentioned the report of a foundry saving over 25,000 lb. of metal in one year on one job alone.

Through the accuracy of the work of the molding machine, he continued, not less than 5 to 10 per cent. of time in finishing in the machine shop is saved, and in quite a number of cases there is only grinding finish left nowadays. The molding machine has been the means of giving the pattern-maker a better knowledge of his trade and foundry practice, consequently raising his mechanical ability. The life of the patterns have been increased tenfold, as there is little chance of the deadly vent wire, rapping bar and sledge hammer, or swabbing destroying them. Again, since we have had to get up a more accurate class of flasks and patterns for machine molding, it has forced us into doing the same thing for hand molding, and this has been the means of a saving in this respect.

We can now understand, he added, that molding machines and other mechanical appliances in the foundry should bear the same relation to the molder as the different machines do to the machinist and pattern-maker. Therefore, if the molder feels disinclined to place himself in the position of machine operator, the only alternative he sees is for manufacturers of molding machines to have instructors go around and train such men for the purpose, especially where they have installed machines. They should also give more talks at foundrymen's meetings.

The Free Public Library of Newark, N. J., is making a collection of the business literature of Newark manufacturers, and has established a business branch at 18 Clinton street, in the center of the city, where catalogues and other printed matter of this character are kept on file. A carefully arranged double index is kept of names of firms and articles manufactured, and the library makes it a point to answer inquiries by letter or telephone, giving probable buyers full information about the makers of products for which they inquire.

Operating Costs of Producer Gas Plants

The Showing of Four Gas-Engine Electric Stations

Some interesting detailed figures covering the cost of operation of electric generating plants employing gas engines supplied from gas producers were recently compiled by a committee of the American Society of Mechanical Engineers—I. E. Moulthrop, chairman; J. D. Andrew, C. J. Davidson, C. H. Duffy, H. J. K. Freyn, W. S. Twining and C. W. Whiting. The brief descriptions of the plants and the analyses of the figures are given in the subjoined review, substantially as submitted by the committee. Reference may well be made here to the evidence of painstaking care and resourcefulness and persistence which has resulted in bringing the authoritative data to light.

Plant A

There are two 250-h.p. pressure producers, 7 ft. inside diameter, with water seal bottoms and 9-in. firebrick linings, also two wet scrubbers, 7 ft. 6 in. in diameter by 18 ft. high, filled with wooden lattice work. There are two dry scrubbers, 7 ft. square by 3 ft. 6 in. high, filled with coarse shavings.

There is one 500-hp. horizontal, double-acting, four-stroke-cycle engine with two cylinders, 23½ x 33 in., arranged tandem. The engine has three bearings rigidly in line. It runs at 150 r.p.m. and is direct connected to an electric generator. It is started by compressed air at 100 lb. pressure, and has an electric ignition of the make and break type, the source of supply being a 110-volt direct current lighting circuit and a motor generator set.

There are two tar extractors and one blower.

The data received covered two complete months. The plant is run 24 hrs. per day, from 6 o'clock Monday morning until 12 o'clock Saturday night, and the current generated is utilized for light and power. During the two months, a total of 308,410 kw.-hr. were generated and 35,190 kw.-hr. were used in the plant, leaving a net output of 273,220 kw.-hr. The fuel used is bituminous coal. The cooling water from the engine is utilized for other purposes, and is not, therefore, charged to the plant. The cooling and cleaning water for the scrubbers is not given.

Cost of Operation per Net Kilowatt-hour.

	Cents.
Fuel .....	.2576
Water .....	.0000
Supplies, oil .....	.0141
Supplies, waste, etc. ....	.0024
Supplies, total .....	.0165
Superintendence .....	.0000
Labor, producer room .....	.1585
Labor, engine room .....	.0555
Labor, electrical .....	.0000
Labor, total .....	.2140
Repairs, producer .....	.0127
Repairs, engines .....	.0040
Repairs, electrical .....	.0000
Repairs, total .....	.0167
Total cost .....	.5048

Plant B

There is one set of producers of the Loomis-Pettibone type.

The data received is for 15 complete months. The plant is to run 10 hr. per day.

Cost of Operation per Net Kilowatt-hour.

	Cents.
Fuel .....	.4460
Water .....	.0879
Supplies, oil .....	.0465
Supplies, waste, etc. ....	.0335
Supplies, total .....	.0800
Superintendence .....	.0000
Labor, producer room .....	.1603
Labor, engine room .....	.2050
Labor, electrical .....	.0000
Labor, total .....	.3653
Repairs, producer .....	.0243
Repairs, engines .....	.2375
Repairs, electrical .....	.0000
Repairs, total .....	.2618
Total cost	1.2410

There is one 500-hp. horizontal, double-acting, four-stroke-cycle engine with two cylinders, 23½ x 33 in., ar-

anged tandem. The engine has two bearings rigidly in line. It runs 150 r.p.m. and is direct connected to an electric generator. It is started by compressed air at 240 lb. pressure, and has an electric ignition of the make and break type, the source of supply being a 110-volt lighting circuit.

Plant C

There are two sets of producers of the Loomis-Pettibone type and of 2000-hp. capacity each.

There are two 1500-hp. horizontal, double-acting, four-stroke-cycle engines, each with four cylinders, 32 x 42 in., arranged twin tandem. Each engine has two bearings rigidly in line. They run at 107 r.p.m. and are direct connected to electric generators. They are started by compressed air and have an electric ignition of the make and break type, the source of supply being a motor generator set supplying current at 60 volts.

The information following is taken from the plant's own forms, as due to the supervision of a State Commission they could not use the committee's forms without duplicating the work.

Cost of Operation per Kilowatt-hour.

	Cents.
FOR THE YEAR 1908.	
Fuel .....	.566
Water .....	.000
Supplies, oil and waste .....	.044
Supplies, miscellaneous .....	.013
Supplies, total .....	.057
Superintendence .....	.031
Labor, producer room and engine room .....	.173
Labor, electrical .....	.000
Labor, total .....	.173
Repairs, producer .....	.006
Repairs, engine .....	.000
Repairs, electrical .....	.004
Repairs, total .....	.010
Total cost .....	.837
FOR THE YEAR 1909.	
Fuel .....	.439
Water .....	.000
Supplies, oil and waste .....	.029
Supplies, miscellaneous .....	.016
Supplies, total .....	.045
Superintendence .....	.023
Labor, producer room .....	.109
Labor, engine room .....	.066
Labor, electrical .....	.000
Labor, total .....	.175
Repairs, producer .....	.020
Repairs, engine .....	.006
Repairs, electrical .....	.002
Repairs, total .....	.028
Total cost .....	.710
FOR THE YEAR 1910.	
Fuel .....	.422
Water .....	.003
Supplies, oil and waste .....	.024
Supplies, miscellaneous .....	.015
Supplies, total .....	.039
Superintendence .....	.026
Labor, producer room .....	.102
Labor, engine room .....	.063
Labor, electrical .....	.000
Labor, total .....	.165
Repairs, producer .....	.024
Repairs, engine .....	.004
Repairs, electrical .....	.005
Repairs, total .....	.033
Total cost .....	.688

Plant D

There are two 400-hp. pressure producers, 8 ft. inside diameter, with water-seal bottoms and with 9-in. firebrick linings, and two wet scrubbers, 8 ft. in diameter by 20 ft. high, filled with coke. There are two dry scrubbers, 6 ft. square by 3 ft. 6 in. high.

There are three 250-hp. vertical, single-acting, four-stroke-cycle engines, each with three cylinders, 20 x 19 in., arranged side by side. Each engine has five bearings rigidly in line. They run at 230 r.p.m. and are direct connected to electric generators. They are started by compressed air at 200 lb. pressure and have an electric ignition of the make and break type, the sources of supply being a primary battery and a direct-driven magneto.

The data received are for three complete months. The plant was in operation 1439 hr. during the three months and generated total of 309,300 kw.-hr. The fuel used was No. 1 anthracite buckwheat.

Cost of Operation per Net Kilowatt-hour.

	Cent.
Fuel .....	.2828
Water .....	.0000
Supplies, oil .....	.....
Supplies, waste, etc. ....	.....
Supplies, total .....	.0572
Superintendence .....	.0000
Labor, producer room .....	.1135
Labor, engine room .....	.2640
Labor, electrical .....	.0000
Labor, total .....	.3775
Repairs, producer .....	.0249
Repairs, engines .....	.1496
Repairs, electrical .....	.0000
Repairs, total .....	.1745
Total cost .....	.8920

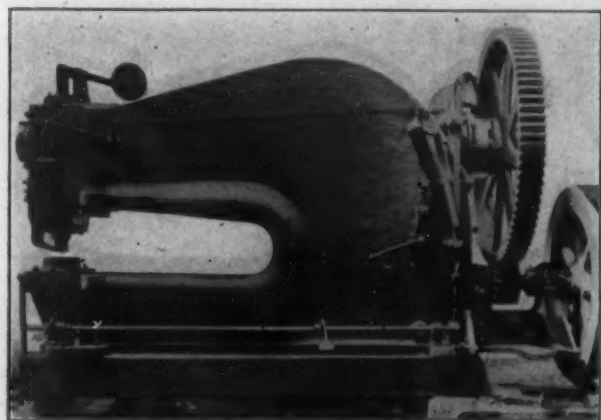
Cost of Fuel at Plants

The cost of coal at the plants given was \$2.55 per ton at Plant A; \$4.53 per ton at Plant B; unknown at Plant C, and \$2.33 per ton at Plant D. Reducing the cost of coal at Plant B to \$2.50 per ton, the costs of operation compare as follows:

	Per kw.-hr. Cents.
Plant A	0.505
Plant B	1.041
Plant C .....	.745
Plant D .....	.892
Average .....	.796

Punch with a 48,000-Lb. Body Casting

An unusually large-sized punching machine has recently been finished by the Queen City Punch & Shear Company, Cincinnati, Ohio, for the Quinlan Boiler Company, Indianapolis, Ind. As the illustration shows, the



Punch Built by the Queen City Punch & Shear Company, Cincinnati, Ohio.

machine is fitted with the manufacturer's patented clutch, that has already been described in *The Iron Age*. The Bollman-Wilson Foundry Company, Cincinnati, poured the casting, which weighs over 48,000 lb. The depth of throat is 66 in., and the machine is intended to punch 4-in. holes through 1-in. plates at the rate of 15 to 20 per minute.

Jones & Laughlin Sales Department Changes.—The Jones & Laughlin Steel Company, Pittsburgh, announces that on or before July 1 the F. A. Goodrich Iron & Steel Company will retire as its Detroit representative and the company will establish its own Detroit office in the Penobscot Building. Frederick H. Holt, heretofore in charge of the office of F. A. Goodrich Iron & Steel Company, will retire as its St. Louis representative and the company will establish its own St. Louis office in the Pierce Building. E. D. Batchelor, heretofore connected with the sales department of the general offices, Pittsburgh, will be district sales manager in St. Louis. Announcement is also made of the establishment of a Pittsburgh sales district by the Jones & Laughlin Steel Company, which has been put in charge of A. C. Pollock, formerly connected with the sales department in the general offices.

The Urwick Machinery & Supply Company, Louisville, Ky., announces that its name has been changed to the Brandeis Machinery & Supply Company.

New Type Slow Speed Exhaust Fan

The slow-speed multiblade exhaust fan, shown in the illustration, which has been perfected by the Buffalo Forge Company, Buffalo, N. Y., has proved by its running record exceptionally economical in power consumption. This has been strikingly demonstrated in an installation of three

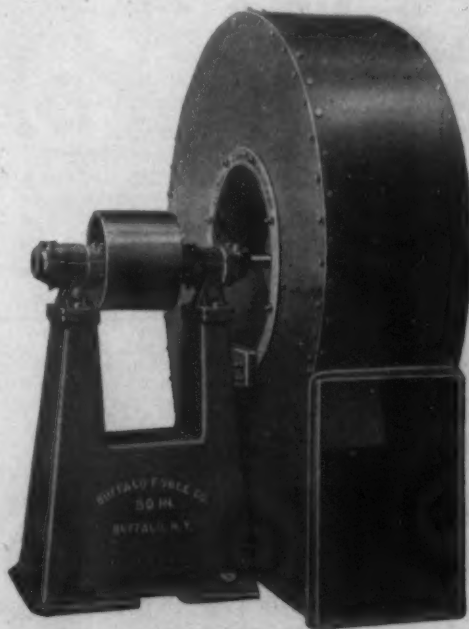


Fig. 1.—The Buffalo Forge Company's Slow Speed Multiblade Exhaust Fan.

double fans which have been in operation for some time. They replaced three double fans, the power consumption of which was 40 hp. The new type is performing the same amount of work with 21 hp. which the company figures as a saving of \$35 per hp., or \$665 per year.

The fan wheel to which this success is attributed is of the multiblade type, with proportions which give maximum efficiency at speeds averaging from 30 per cent. below the normal for exhaust fans. The slow speed is an important feature, as it reduces power consumption, minimizes wear and cost of upkeep, and lengthens the life of the equip-

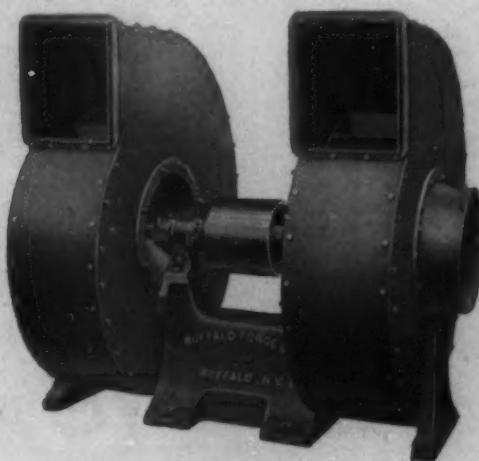


Fig. 2.—The Double Type of the Slow Speed Fan.

ment. The possible applications of the type are almost as numerous as those of the standard design. It is made single or double in sizes from 30 in. to 80 in. diameter for pressures from 1 to 6 oz. The housing is reversible.

The Automobile Club of America, Fifty-fourth and Fifty-fifth streets, west of Broadway, New York, has issued the rules which will govern the aeronautical motor contest for the club's \$1,000 cash prize. The contest will be conducted in the club's laboratory after July 1, when the entries will close. The trials will include a test of three hours' duration at constant speed; a test to determine ease and certainty of starting; and various other short tests which the committee may require.

A Belt-Driven Flue Sheet Drill

One of the Recent Harrington Products

For the rapid production of repetition work consisting of the drilling of holes in flue sheets and pieces of that nature Edwin Harrington, Son & Co., Inc., Seventeenth and Callowhill Streets, Philadelphia, Pa., have developed a tool which is known as the No. 14 belt-driven multiple drill. Three 1½-in. drills can be used with steel and the special features of the machine are an easy adjustment of the table and the spindle heads, as well as the convenient grouping of all the operating handles.

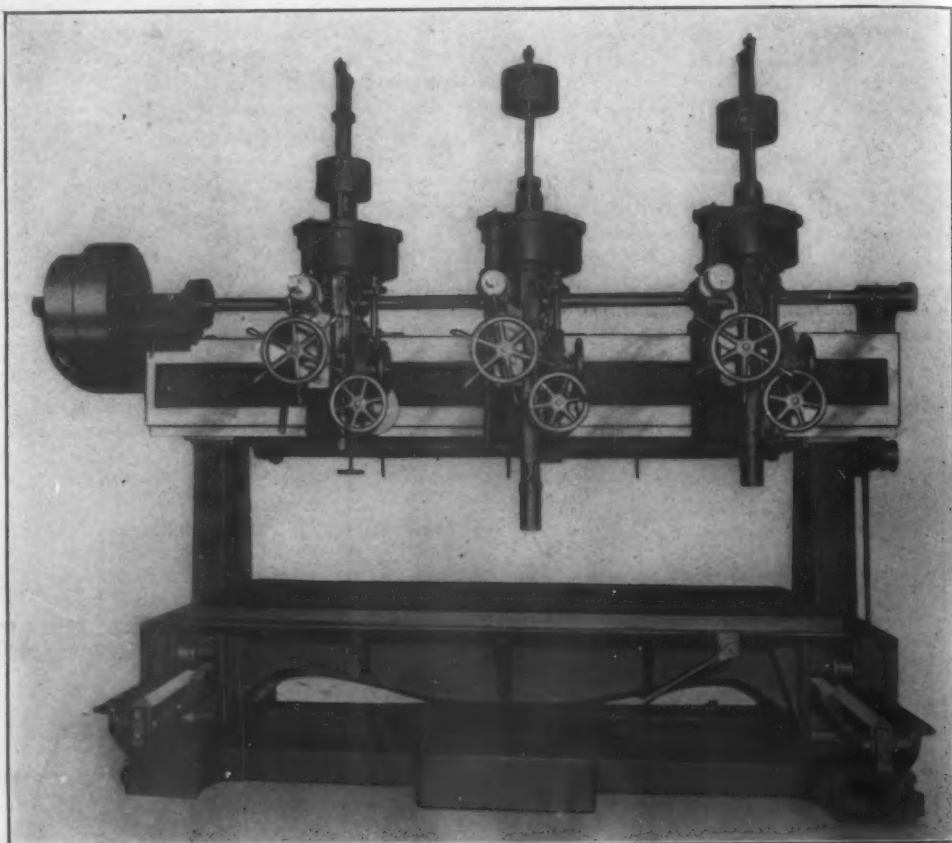
The tool is driven by a belt running from an overhead countershaft to the two-step cone pulley which is back geared on the horizontal shaft. Four spindle speeds ranging from 50 to 150 r.p.m. are available. From this horizontal shaft a pair of mitre gears transmit the power to the shaft on each arm which in turn drives the individual spindles through a pair of miter and spur gears. To keep down the weight steel castings are used for the spindle heads which have independent movement of the arm by a hand operated lever. The large hand wheel shown on each head controls the lateral traverse of the arm along the cross rail through a rack and pinion. The forged high carbon steel spindles have a large diameter in the sleeve and are equipped with ball bearings to take care of the thrust. A counterbalance which is constant in all positions operates directly on the spindles. The feed is independent for each spindle and is of the all gear type, the mating gears in this train and in all the others of the tool being alternately steel and bronze with teeth of coarse pitch. Three feed changes, ranging from 0.0036 to 0.0108 in. per revolution of the spindle, are available. There is an automatic trip operating through a positive clutch on the feed worm shaft as well as a hand wheel where it is desired to employ hand feed. For the quick return of the spindle the worm wheel is disconnected by a positive tooth clutch on the hand wheel. The cross rail is of heavy box section with a wide face for the arm saddles and a wide bearing on top of the uprights. The latter are very rigid, the section for all the members being that of an I-beam and support the runways and the traverse rack for the table.

The table is mounted on rollers which give an easy in and out motion which is controlled by a ratchet lever at the front of the drill. This lever operates a rack and pinion at both ends and a binder lock keeps the table securely in position. If desired, a stationary table can be furnished which is bolted rigidly to the upright and in this case no base is used. T-slots parallel with the front of the table are cut in the upper surface of the table. The base is of heavy construction and supports the uprights rigidly in addition to having a tank for the surplus lubricant. An oil pump forces the lubricant from this reservoir to the long delivery tank located under the cross rail.

The following table gives the principal dimensions and specifications of the drill:

Surface of table, inches.....	86×40
Length of crossrail, inches.....	140
Minimum distance between spindles, inches.....	18
Maximum distance between end spindles feet.....	6
In and out movement of spindles, inches.....	6
Vertical traverse of spindles, inches.....	15
Maximum distance between spindle and table, inches.....	27
Minimum distance between spindle and table, inches.....	12
Minimum distance between spindle and face of upright, inches.....	12
Movement of table, inches.....	40
Diameter of Spindle in sleeve, inches.....	1 15/16
Morse taper in spindle.....	No. 5
Number of spindle speeds.....	4
Maximum spindle speed, r.p.m.....	150
Minimum spindle speed, r.p.m.....	50
Number of feed changes.....	3
Maximum spindle speed per revolution of spindle, inches.....	0.0108
Minimum spindle speed per revolution of spindle, inches.....	0.0036
Movement of table, inches.....	40
Opening between uprights, inches.....	110
Sand on countershaft pulleys, inches.....	24
Face width of countershaft pulleys, inches.....	7½
Speed of countershafts, r.p.m.....	375
Overall height, inches.....	124
Floor space required, inches.....	168×106
Weight, pounds.....	18,800

While the number of heads of this machine and their



The No. 14 Belt-Driven Multiple Drill for Flue Sheets and Similar Work, Built by Edwin Harrington, Son & Co., Inc., Philadelphia, Pa.

dimensions are those best suited to general requirements, if desired some of them can be varied to meet the needs of any particular case.

The Riverside Metal Refining Company, Connellsville, Pa., manufacturer of ingot brass, but making a specialty now of babbitt metals, has recently appointed the following as its sales representatives: H. P. Weller Company, Erie, Pa.; Humbird Supply Company, Cumberland, Md.; Erie Mill & Marine Supply Company, Buffalo, N. Y.; Niagara Machine Company, Niagara Falls, N. Y.; Union Electric Company, Pittsburgh. It maintains a branch office and warehouse at 1111 Superior Viaduct, Cleveland, Ohio. The company has recently introduced a new babbitt, known under the name of Silver Bar, intended for slow, heavy and rough work, being specially prepared for tin plate and other rolling mill bearings. A recent test showed it to stand a compression of 35,075 lb. per sq. in. The company is also the manufacturer of the U. S. standard babbitt, for all round journal service; Riverside special, which is a high-grade babbitt, and other grades for a large variety of work. It manufactures its products along scientific lines, having a completely equipped laboratory in its plant for making tests, etc.

New Drive for Planers

Employment of Reversing Electric Motor Obviating Use of Flywheels or Belting

For nearly a year the Triumph Electric Company, Oakley, Cincinnati, Ohio, has been experimenting in the shop of the Cincinnati Planer Company with a new kind of motor drive for planers. The accompanying illustration shows a reversible motor coupled direct to the driving shaft, or, as is more commonly termed, the pulley shaft of a 56 x 72-in. planer. The coupling is directly under the shield shown on the left of the motor and the drive does away with pulleys, shifting mechanism, belts and overhead equipment.

Instead of the belts shifting and reversing the pulleys, the motor is automatically stopped, reversed and started again as quickly, it is explained, as can be accomplished with the ordinary belt shifting planer. This is done by changing the direction of the current, thus converting the motor into a generator and using up the power generated in a dynamic brake that brings the planer to a dead stop quickly as if a mechanical brake was applied. This is done by means of a transfer switch connected up with the shifting mechanism, so that the table dogs throw over

planer there is a small motor attached, with a double throw switch, one side being used to elevate the rail and the other side for lowering the rail, thus doing away with any belts on the machine.

The manufacturer calls particular attention to the fact that this particular drive is especially advantageous when applied to the larger sized planers as with the usual larger types of planers the fly-wheel inertia is naturally much greater to overcome.

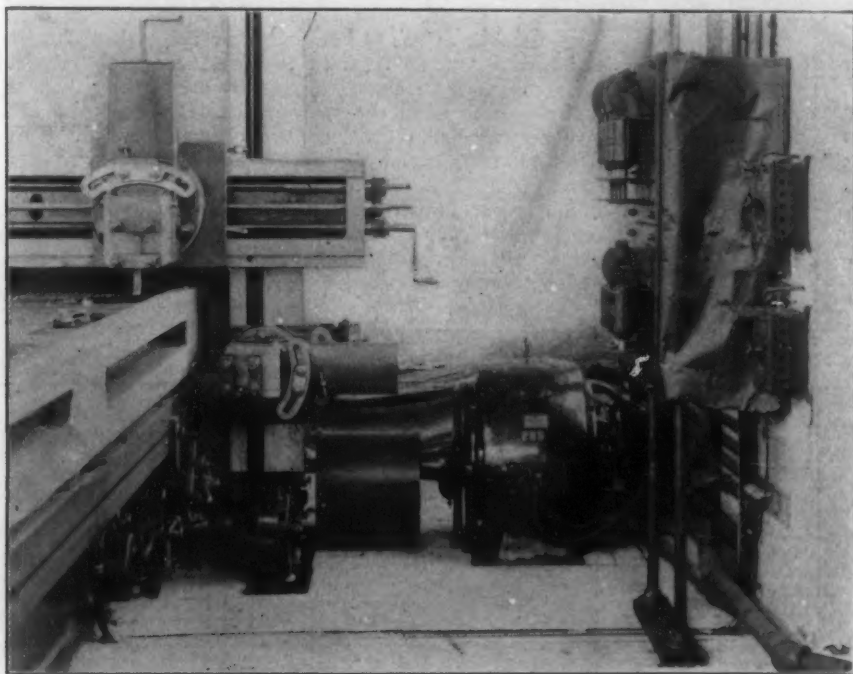
Attention also is called to the fact that the reversible motor can be applied to either the right or left side of the planer, and further, if there is not much floor space it can be run lengthwise of the machine by putting in bevel gears. The controller board can also be placed to suit the various shop conditions. With each outfit the transfer switch on the bed as well as the controllers and the small motor on top are furnished.

Boring and Internal Threading Tool

The Ready Tool Company, Bridgeport, Conn., has placed on the market a new boring and internal threading tool known as the Red E. The boring cutter is held by a set screw in the back of the bar, forcing the rod which passes through the bar against the sliding wedge, a construction which holds the cutter from all movement. In this way alignment and the absence of chatter are obtained. To sharpen the tool the lathe carriage is run back and the set screw loosened, which releases the wedge so that the cutter may be removed. When the tool is replaced in the holder the constant level and alignment have not been lost.

The bar is held rigid in the holder by a sliding dog which is forced down by two set screws, a method that avoids marring the bar and at the same time holds it solid. In addition a means of adjustment is obtained, so that the operator may take out the bar and replace it with a piece of solid steel $\frac{1}{4}$ or $\frac{3}{8}$ in. in diameter for boring small holes. The equipment also includes an internal threading tool which has a cutter screwed into the end and ground to the usual 60-deg. angle. Extra cutters for boring and threading tools can be

furnished. The side of the regular No. 2 holder is $\frac{5}{8}$ in. by $1\frac{1}{4}$ in.



Triumph Electric System Applied to a Cincinnati Planer.

this switch, reversing the current through the controllers instead of shifting the belts, as is usual with a line shaft driven planer.

Next to the controller panel are two hand controllers. The upper one is for varying the cutting stroke, by which speeds from 25 to 60 ft. per minute can be obtained. The lower one is for the return stroke which can also be varied in speed from 50 to 100 ft. per minute. After the hand controllers are once set they remain stationary and do not move every time the planer reverses, the variations being maintained through resistance coils, so that all parts are stationary.

With this drive it is claimed that a much smaller type of motor can be used than is generally attached to the top of a planer, because there are no large diameter pulleys to gather fly-wheel inertia, that have to be stopped and reversed. Consequently there is a minimum peak load, and in addition to the lessening of current consumption it is found that there is less cost in maintaining the driving mechanism, as there are no belts or pulleys to renew. Another very commendable feature is the absence of noise. Experiments have also shown that a planer can be driven for hours on a short stroke of only 5 or 6 in. without consuming excess power or heating the motor.

In place of the usual elevating device on top of the

Cutting Worm Gear on Gear Hobbing Machine

A Hindley worm and gear was recently produced on a No. 2 Schuchardt & Schütte gear hobbing machine. The worm blank was fastened to the hob arbor in place of the hob ordinarily used when cutting spur, worm or spiral gears, and it was cut with a single tooth of accurate shape clamped on the rotating table. The table was then slowly fed toward the worm blank similar to the manner of hobbing worm gears.

For cutting the worm gear the blank was mounted on the table by means of the rigid supports regularly furnished with these machines, and a special cutter arbor with two teeth was inserted in the cutter spindle. The gear was then finished in the ordinary way employed for hobbing worm wheels by feeding the table gradually to the work until the proper depth was reached.

The results in both cases, it is stated, were entirely satisfactory. This fact is of interest in view of the extensive trials carried on at the present time by automobile concerns to use the Hindley drive in automobiles.

Uehling Waste Meter

A Combination Instrument for Measuring the Temperature of the Flue Gases and the Percentage of CO₂

The waste of heat in boiler plants can be greatly reduced by giving more careful attention to what goes on in the furnaces. The use of the indicator, the thermometer, the steam gauge and electrical measuring instruments has produced a noticeable increase in the efficiency of the engine room and the measurement of the coal and water used in the boiler plant by scales or meters and also the measurement of the waste by a waste meter will result in a considerable decrease in the cost of power production. On the average about 40 per cent. of the heat produced by the fuel burned is lost, three-quarters of which is carried away by the gases which escape from the chimney at a high temperature. Radiation is responsible for half of the balance of the losses, while the loss in soot and smoke can be figured as 1 per cent., the actual

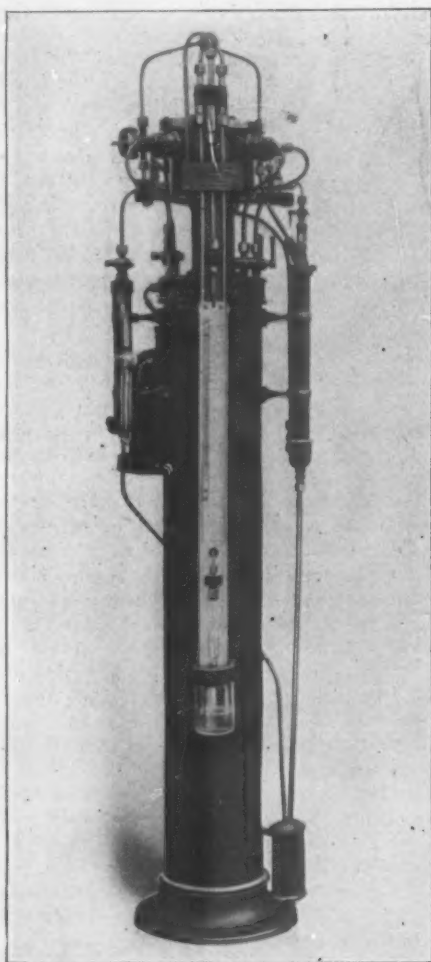


Fig. 1.—A New Type of Meter for Measuring the Percentage of Carbon Dioxide and the Temperature of the Flue Gases
Made by the Uehling Instrument Company,
Passaic, N. J.

loss of coal through the grates at 2 per cent. and the loss due to the formation of carbon monoxide instead of carbon dioxide furnishes the remaining 2 per cent. The amount of coal waste due to heat losses of the stack are quite generally realized, as is also the fact that a considerable reduction can be obtained in the chimney loss by measuring the carbon dioxide.

The CO₂ recorder was devised to give the engineer an authentic indication of the amount of waste occurring and the measurement of this by an instrument gave an indication of how much air was being used per pound of coal, which is the most important item in determining the amount of loss in the waste gases going up the chimney. The other important item, the temperature, is taken by pyrometers or some other form of instrument. One of the chief objections to the CO₂ recorder is that the one

machine does not give a record of the percentage of carbon dioxide and the temperature. These instruments generally operate on the principle of absorbing the carbon dioxide in the flue gas in a solution of caustic potash and the difference in the volume of the gas before and after the dioxide was extracted gave a measurement of the amount in the gas. If instead of measuring the percentage

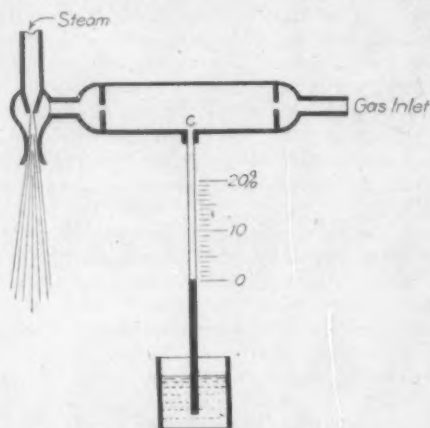


Fig. 2.—Sketch Showing the Principle of Operation of the Meter.

of carbon dioxide by measuring the actual volume of a given amount of gas before and after the carbon dioxide has been extracted from it, the pressure of the gas is measured; then the change in pressure due to the reduction in its volume when the carbon dioxide is absorbed will give a ready and reliable method of measurement. This has been taken advantage of by the Uehling Instrument Company, Passaic, N. J., in the construction of a new type of boiler room instrument which measures both the percentage of carbon dioxide and the temperature of the flue gases. Fig. 1 is a view of the instrument. Fig. 2 is a sketch showing the principle of operation and Fig. 3 illus-

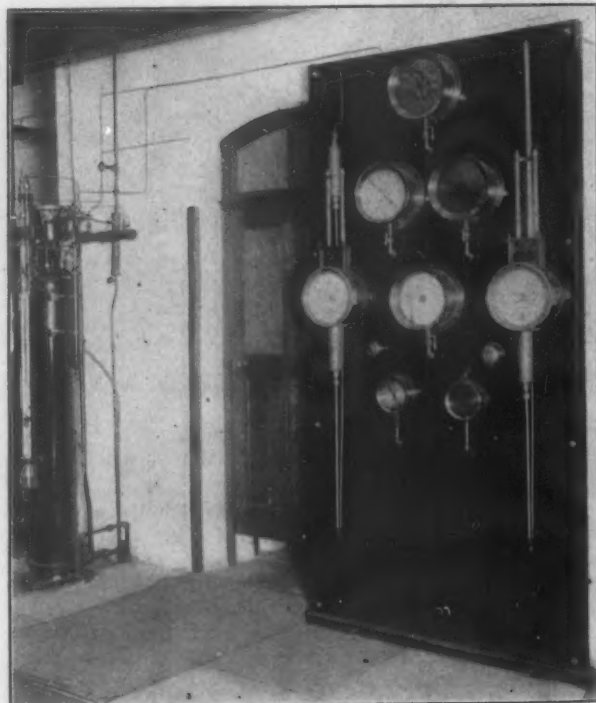


Fig. 3.—An Installation of One of These Meters in a Boiler Plant.

trates an installation of one of the meters in a boiler plant.

Fig. 2 shows how the principle of the change in the pressure of the gas is used for measuring both the percentage of carbon dioxide and the temperature of the flue gas. The latter is drawn through the apparatus continuously by a small steam aspirator. Between the two apertures, or in other words in the chamber *c*, the carbon dioxide is absorbed and thus the volume of the gas between the apertures is reduced by an amount which depends upon the percentage of CO₂ present. Any reduction of the volume of the gas between these apertures

increases the vacuum and these changes are proportional to the amount of carbon dioxide absorbed, which enables the suction or partial vacuum formed to be used as a basis for indicating and recording percentages of the dioxide in flue gases. As this same principle and similar apparatus can be used to measure temperature it is possible to combine the two machines in one and give a highly efficient meter. In measuring the temperature the change in vacuum is secured by reason of the difference in the temperature between the two apertures. One of these is in a nickel tube placed in the flue or other part of the furnace while the other is maintained at a constant temperature by the exhaust steam.

The indicating instruments are simply properly calibrated columns which are supplied for installation at the machine proper and also for the front of the boiler. The latter are found to be useful since reference can be continuously made to them, while the recording charts are more valuable as permanent records from which average results obtained with different kinds of coal, different grate areas and different drafts can be determined. The recording instrument can be placed anywhere and any number of them can be employed without impairing the efficiency of the instrument as all they do is to record the partial vacuum or the suction.

The appearance of a combined instrument of this type is shown in Fig. 3, which is a photograph of one of these meters installed in the plant of the Robert Gair Company, Brooklyn, N. Y. In this installation the two indicating columns for the percentage of carbon dioxide and for the temperatures can be seen at the front of the instrument proper, while the recording gauges are mounted at the left and the right of the board respectively.

The Angle Steel Tool Truck

The tool truck shown in the illustration is designed by its builder, the Angle Steel Tool Company, Otsego, Mich., with the purpose that it may be rolled from one part of a shop to another, from operator to operator and from machine to machine. It is especially useful in such work as assembling machinery when many small parts such as castings, bolts, nuts, screws and tools are required.

The truck is so constructed that it may be employed for special purposes by the use of different units of gal-



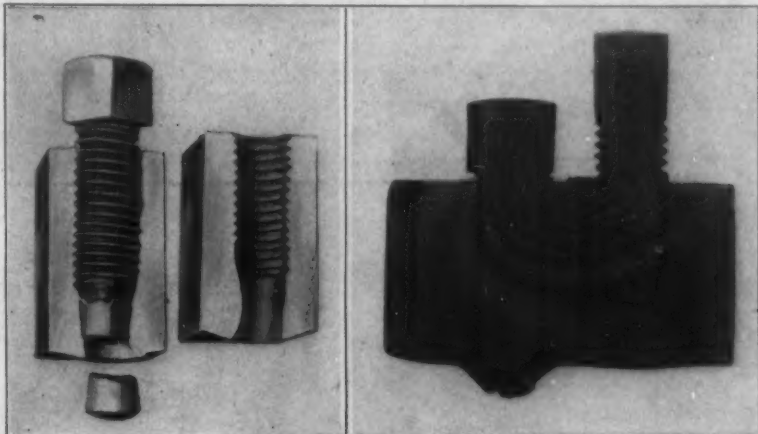
The Angle Steel Tool Company's Tool Truck.

vanized sheet steel trays in desired depths and required weights. The trays are removable and interchangeable. The frame is of high-carbon angle steel, braced with flat steel bars. The caster is of special design, made to fit perfectly, riveted fast to the foot of the truck and mounted with heavy roller bearings. The size of the machine as illustrated is 31 x 31 in. square and 36 in. high.

A Steel of Great Torsional Strength

The steel which is shown in the illustration in the form of set screws has been put on the market by Harrington, Robinson & Co., 178 High street, Boston, Mass. The process was developed by H. E. Mack, Jr., manager of the firm's steel department. It is a uniform, homogeneous product, made in crucibles, and supplied in the bar, forging or casting. In the bar form it is as free-cutting as soft annealed, high-grade tool steel. For forging and welding it occupies a place midway between soft 0.20 carbon steel and 0.40 carbon steel, low in phosphorus and sulphur.

The manufacturers have thus far specialized with this steel in a new set screw, known as the Mac-It. Its pecu-



A Steel of Great Torsional Strength—Tests Made with Set Screws

liarity is an extraordinary torsional strength. The head of a 1/2-in. 13-thread screw passed through two complete revolutions before breaking with 1000 ft. lb. applied on the lever of the testing machine. Breaking at the end of two revolutions, the screw was found to have a core so soft that it could be drilled with a No. 20 drill. In another test, using a 3/8-in. tap, the indicator of the testing machine showed 3/4 h. p. at the moment of breaking.

The results of an exceptional test are seen in the photograph. A piece of cold rolled steel, 1 1/4 in. thick, was drilled and tapped, leaving 3/8 in. at the bottom. The screw was then introduced, and when it had reached the bottom; a 4 ft. leverage was applied at its head, driving it completely through the solid metal. It will be noticed that the end of the screw did not upset or mush up. In the other illustration the screw on leaving the bottom of the thread had received three turns and was stopped purposely, a close scrutiny showing that the bottom extended a little.

Manufacturing on a commercial scale has been in progress but a short time. However, upward of 20,000 of the screws have been tested in nearly 300 different places, and as a result the makers' contention is that a 1/2-in. screw cannot be twisted off with a 15-in. wrench. It is believed that a large field of usefulness exists for this screw, the experience being that manufacturing plants, and machine shops in particular, are eager to secure a set screw which is practically unbreakable. It is proposed to carry these screws in stock in standard sizes and to manufacture special threads to order.

The Lake Superior Iron & Chemical Company has added another stack to its inactive list of blast furnaces. This one is the furnace at Elk Rapids, Mich., the yards at which contain a large amount of unsold charcoal iron. During the shutdown extensive repairs will be made. Other furnaces of the company not now producing iron are those at Manistique, Newberry and Chocoley, Mich.

The Asphalt Ready Roofing Company, 9 Church street, New York City, has brought out a new product known as the Rockland roofing. Its pliability and its waterproof quality have long life, and the material can be laid in extremes of weather when the usual tendency is to cause roofing to become brittle and crack. It is made from asphalt, mineral surfaced. It is manufactured in rolls 36 in. wide, which would cover 100 sq. ft. of surface, exclusive of laps.

Air-Cooled Choke Coils

For protecting transformers and other electrical apparatus from the disastrous effects resulting from the transmission line being struck by lightning, choke coils are connected in series with the line as close as possible to the point where it enters the transformers. Local conditions frequently make it necessary to mount them either upright, horizontally or in an inverted position. On account of the necessity for frequently inverting these coils the Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa., has developed a new choke coil known as the type D I air-cooled coil, which can be mounted so that the insulating coil supports are pendant or the coil rests upon the supports as illustrated.

The coil proper consists of an aluminum rod of a diameter large enough to carry 200 amperes safely, which



The Type D I Air-Cooled Choke Coil Made by the Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa.

is bent into a helix approximately 15 in. in diameter and containing about 30 turns and reinforced by bracing clamps to give the helix the necessary mechanical strength. Two insulating columns made up of porcelain insulators, which are interchangeable except for the end pieces, support the coil, the number of insulators used in any column being dependent upon the voltage of the circuit in which the coil is to be mounted. These columns are supported on substantial cast-iron blocks fixed on wooden bases and can be removed and inverted by taking out four bolts. This arrangement enables the coil to be mounted in the most convenient position for wiring on either the floor or the wall or the ceiling. For upright mounting on the floor the parts are arranged as illustrated, while for inverted mounting the position of the columns is reversed and the base is attached to the ceiling.

The coils are intended primarily to protect transformers and for that reason should not be employed in connection with generating apparatus. If a greater reactance is required in connection with a high-voltage circuit than is afforded by a single coil this can be secured by connecting two or more coils in series.

The Southern Iron & Steel Company has opened a warehouse in Memphis, Tenn. It will be used as a distributing station for the Mississippi delta district.

Electric Forge Blowers

A recent product of the American Blower Company, Detroit, Mich., is an adaptation of its Sirocco blower for use as an electric forge blower, the power being secured from an ordinary electric light outlet. The advantages claimed for an electric forge blower over the hand blower include economy of space since it can be put under the forge or in any other place out of the way, starting or stopping it by a switch placed in a very convenient loca-

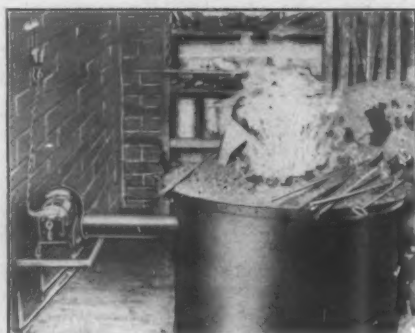


Fig. 1.—The Sirocco Electric Forge Blower, Made by the American Blower Company, Detroit, Mich.

tion for the blacksmith to reach from the forge or the anvil; the production of a strong and positive blast, building the fire up more quickly than is possible with a hand bellows or hand blower, and the production of more work in the same amount of time. Since the blower requires no attention while the iron is heating, other work can be prepared or finished. Fig. 1 shows one of these blowers installed to supply the blast to a furnace, while Fig. 2 illustrates the three sizes of blowers made.

The special advantages claimed for Sirocco blowers as compared with the other blowers of this type are a higher mechanical efficiency, quiet running, larger volume of air, quicker and hotter fires and smoother operation. The use of the Sirocco turbine type wheel reduces the amount of current consumed to practically nothing by reason of its high mechanical efficiency. This wheel is screwed to the motor shaft, an arrangement which reduces the number of bearings in the entire machine to two, and in addition there are no belts, levers, gears, pulleys, cranks or spindles used in this construction.

Three sizes of blower are made, as shown in Fig. 2, which are known as the 6½, 9½ and 12½ in. sizes respectively. The smallest one, which is suitable for a sin-

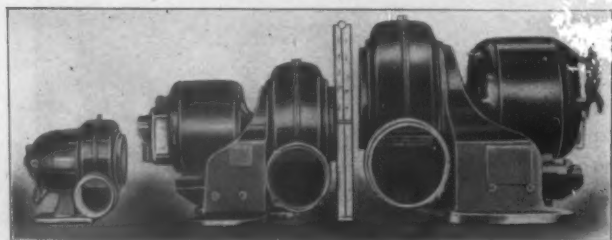


Fig. 2.—The Three Sizes of Blower Made.

gle light fire, consumes less than half the current required by an ordinary electric lamp and the larger ones possess the same relative efficiency. The largest blower is capable of caring for five fires.

Tests of malleable iron showing a notable reduction in area in connection with the tensile strength are reported by the Ohio Malleable Iron Company, Columbus, Ohio. A test made at the Detroit Testing Laboratory showed an elastic limit of 37,195 lb., a tensile strength of 53,283 lb., an elongation of 15.62 per cent. and a reduction of area of 21.38 per cent. A test at the Pittsburgh Testing Laboratory showed an elastic limit of 34,750 lb., a tensile strength of 54,340 lb., an elongation of 18 per cent., and a reduction in area of 21.1 per cent. A test made by Robert W. Hunt & Co., gave an elastic limit of 41,195 lb., a tensile strength of 52,940 lb., an elongation of 17 per cent., and a reduction in area of 25.63 per cent.

The Cause of the Shelling of Wheel Tires

Stahl und Eisen gives a short report by Professor O. Bauer and E. Wetzel from the Royal Testing Laboratories in Grosz Lichterfelde, entitled "Injuries to Tender Wheel Tires through Strong Local Cold Work," the subject being a tire that showed bad scaling or shelling. It was submitted for examination to see if the cause of the shelling was due to un-uniformly hard material or to blowholes.

A piece was cut from the position marked C in the diagram Fig. 1. It was heated to a very dull red heat and straightened. Test pieces were cut for physical tests in the places marked 1 and 2. When tested they gave perfectly satisfactory results.

Other pieces were then cut right across the tire at A and B, and were polished and etched with copper ammonium chloride. They were entirely free from segregation, large slag inclusions, hollow places or blow holes. Large and small cracks could be seen where the shelling had taken place. The pieces were again polished and etched with 1 per cent. HCl solution in alcohol, for microscopic investigation. The structure shows ferrite and pearlite, with the former slightly in excess; and near the shelling the constituents are stretched and bent partly parallel to the tread of the tire, and partly in other directions. It shows clearly the influence of very strong cold working.

Hardness tests were made with a hardened steel ball pressed into the surface to a standard depth. The locations of the tests are shown in Figs. 2 and 3, the hardness number being put inside the small circles. In each case the metal near the tread of the tire is harder than the remainder. To determine whether this was due to the material or to its treatment, pieces A4, A8, B4, and B8 were heated to 800° C. for a quarter of an hour, and then tested again. The results were:

A4	137	B4	139
A8	137	B8	135

These show no appreciable difference, the material near the tread being of the same hardness as the material further removed. The conclusions arrived at are as follows:

1. Based on the physical tests, the material is fully up to the specifications.

2. The shelling is not due to blowholes or other defects of the material. Where the tire shows shelling the material shows the effect of very strong work either at the ordinary temperature or well below the annealing temperature, such as strong local shocks, excessive braking, etc.

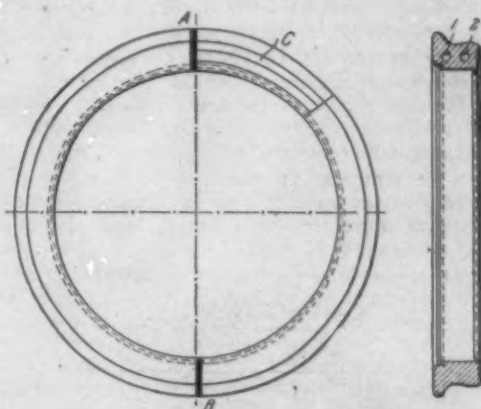


Fig. 1.—The Cause of the Shelling of Wheel Tires. Diagram Showing Sections Used in the Tests.

Through such strong local cold work small cracks are produced.

3. The ball tests show that the influence of the cold work extended to a considerable depth, and caused an increase in hardness.

G. B. W.

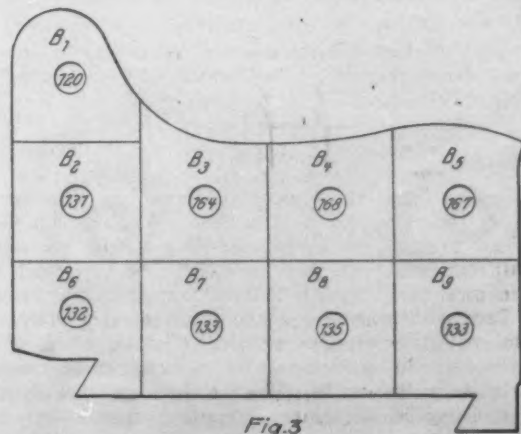
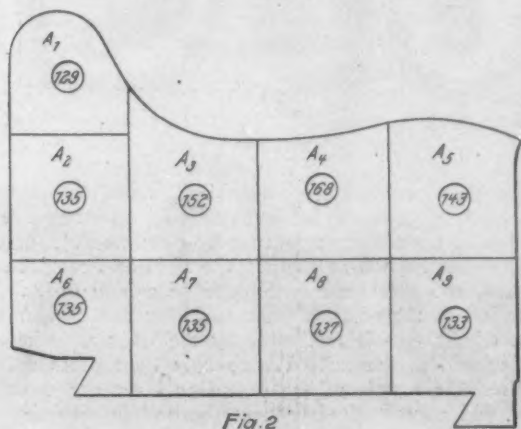
The Baldwin Locomotive Works

The Baldwin Locomotive Works, recently incorporated under the laws of Pennsylvania, is the new company that will succeed the old Baldwin Locomotive Works, Philadelphia, the name being thus preserved. The new company has \$20,000,000 authorized and outstanding 7 per cent. cumulative preferred stock with full voting power and \$20,000,000 authorized and outstanding common stock, making a total capital stock of \$40,000,000. The preferred stock is redeemable, but only as a whole, at \$125 per share and accrued dividends. This stock can be increased only with the consent of the holders of majority of the preferred shares outstanding at the date of any increase. The officers of the new company are as follows: President, Alba B. Johnson; vice-president, Samuel M. Vaclain; chairman of the Board of Directors, William L. Austin; directors, the foregoing and William Burnham, E. T. Stotesbury, T. DeWitt Cuyler, Roland L. Taylor, E. C. Converse, Samuel McRoberts, Charles D. Norton, Otis H. Cutler and Francis M. Weld.

President Johnson states that officers and managers of the former company take for investment \$5,000,000 of the preferred stock of the new company. They hold also a majority of the common stock in the new company, and are to continue to manage the business. As audited, combined profits of the Baldwin Locomotive Works, the old company, after expenses, charges, taxes, depreciation and sinking fund, were \$2,706,280 for 1910, and the average annual combined net profits for the last ten years were \$2,528,633. Application is to be made to list the preferred stock on the New York and Philadelphia Stock Exchanges.

The Homestead Valve Mfg. Company, Pittsburgh, Pa., has appointed Frederick K. Blanchard, 422 River street, Troy, N. Y., its representative in Albany and Troy and vicinity. He will have quite a stock of Homestead valves on hand, thus being prepared to furnish them on short notice.

The Savage Mountain Fire Brick Company, Frostburg, Md., has completed an addition which increases its tile capacity 2000 per day and has under construction several minor improvements. The Savage Mountain roof brick is now widely known. The plant has been in the Gorsuch family for over 47 years. Chas. C. Gorsuch is president and John A. Caldwell is treasurer and manager.



Diagrams Showing Position of Hardness Tests and Degrees of Hardness in Section of Wheel Tire.

The Garrigus Surface Grinder

The surface grinding machine shown in the illustration is known as the Bristol No. 1, style A, built by the C. G. Garrigus Machine Company, Inc., Bristol, Conn. It is designed for use in the manufacture of dies for presses and stamps, and for other similar work. The bearings constitute a special feature, consisting of slip bronze sleeves, adjustable, $\frac{1}{8}$ in. in diameter, and self-lubricating and dust proof. On the bottom of the surface table is cast a shank, which is threaded, permitting a fine adjustment by means of a bronze screw nut and a hand wheel located directly beneath the center of the abrasive wheel. A check nut is provided to take up the wear, so that the table cannot work down under the cut. The table is also adjustable up and down on the column and is counter-weighted. A tool rest is provided for the other wheel.

The table is 8 by 15 in., and the maximum distance from the center of the wheel to the top of the table is 17



The Bristol No. 1, Style A Surface Grinder, Built by the C. G. Garrigus Machine Company, Inc., Bristol, Conn.

in. The spindle is made to take abrasive wheels 8 in. in diameter with a maximum thickness of $1\frac{1}{4}$ in. The driving pulley is 4 in. in diameter, with 3-in. face, and the tight and loose pulleys of the counter shaft are of 6-in. diameter. The spindle is intended to run at 2000 r.p.m., the speed of the counter shaft being 500 r.p.m. The height of the machine is 3 ft. 4 in.

Rumors that the Jones & Laughlin Steel Company is making plans for building a large coke plant at Aliquippa, Pa., are officially denied. No plans are under way at present for any further extensions there. The four blast furnaces and the Talbot open-hearth furnaces are completed and ready to run and will be started as soon as conditions in the steel trade improve.

A 5 per cent. nickel steel is hardest magnetically when quenched in the neighborhood of about 900 deg. C. (1650 deg. F.), according to Dr. E. Colver-Glauert and Dr. S. Hilpert of Berlin, Germany, in a paper before the Iron and Steel Institute on "The Magnetic Properties of Some Nickel Steels." Quenching from higher temperature results in a softer material.

A Handy Hydraulic Press

A new type of small hydraulic press has been recently placed on the market by the Watson-Stillman Company, 190 Fulton street, New York City. Although especially intended for crushing specimens of common building material in the laboratory, it can nevertheless be used in the machine shop for a large number of purposes. Some of the applications of the press are for press fitting small parts and applying a high pressure to small articles to be bent, straightened or flattened.

This press has been brought out to fill the demand for a small press which could be substituted for the ordinary expensive and cumbersome compression machine for use on construction work, in machine shops and material testing laboratories. For press fitting of a delicate nature it is absolutely essential that the operator should know the amount of pressure that is being applied. If one man were to do all the work of a certain nature which came into a shop it would, of course, be satisfactory to depend upon his sense of touch, but where it is necessary to divide the work among several operators some more accurate means of measuring the pressure must be devised, since it is difficult for one person to communicate to another the sense of touch, and it is also natural for an operator to watch the gauge of the press. In the cement and concrete field the press will



A Small Hydraulic Press, Built by the Watson-Stillman Company, New York City.

enable those in charge of the work to test the material employed in compression, which, it is claimed, will do away with a number of failures of concrete buildings.

The construction of the press is rigid and compact, the material and the workmanship are of a high order. The operation of the press is quick and easy and rapid movement of the ram is facilitated by the lever and the connecting rod at the left. Where only light pressures are required the handle of the extension lever socket at the right will operate the pump easily, and by applying the extension lever it is possible to develop a pressure of 30 tons. The platens are 8 in. square, the distance between them when opened to their maximum is 8 in., and the movement of the ram is 4 in. The overall height of the press is 27 in. and the base measures 12 x 16 in. A steel forging which is machined to fit perfectly into the reservoir is used for the main cylinder and the pump cylinder is of bronze.

A special meeting of stockholders of the Youngstown Sheet & Tube Company will be held at Youngstown, Ohio, July 25, to vote on a proposed increase in the capital stock from \$10,000,000 to \$15,000,000. The new stock will be 7 per cent preferred, with dividends payable quarterly; will have no voting power and is redeemable after 1921 at 105 and any arrearages in dividend. A large part of the new capital will be used in building an open-hearth steel plant and finishing mills. Work on the open-hearth plant will probably be started about September.

Mattie furnace of the Girard Iron Company at Girard, Ohio, was blown out last week for repairs.

Potassium Chromate as Metal Protection Agent

Potassium bichromate as a material to prevent the corrosion of metals was referred to at length in a joint paper by J. Newton Friend and Joseph H. Brown, both of Darlington, England, on "The Action of Aqueous Solutions of Single and Mixed Electrolytes upon Iron" read before the Iron and Steel Institute. For tanks kept at ordinary temperatures and holding liquids containing appreciable quantities of salts, not necessarily common salt, of course, an addition of about 1 lb. of bichromate to 10,000 lb. or to 1200 gal. will, it is asserted, exert a marked retarding action upon corrosion. If the concentration of the dissolved salts is small, the bichromate may with advantage be increased to about 10 lb. per 1200 gal. With boiling solutions, however, it appears that while the presence of the first mentioned proportion of bichromate is powerful in retarding corrosive action of the metal, a proportion ten times greater is far less beneficial and under some conditions may enhance the corrosive action of the liquid. Herein lies the objection to the use of bichromate owing to the impossibility of regulating the concentration of the salt to the nicety desirable to obtain the maximum efficiency.

Owing to the small quantities of bichromate useful in retarding corrosion, the author suggests that better results might be expected if a chromate were used instead. It appears that too much chromate cannot be added, as by increasing its concentration, even up to saturation, no ill effects are produced, but rather the tendency to corrode is reduced still more. Finally, the experiments showed that the addition of about 8 or 9 lb. of the chromate salt per 1000 gal. of water exerts a marked retarding effect upon corrosion, and that a further increase in the concentration of the salt is even more beneficial in the presence of small amounts of the chloride, an excellent protection being secured with about 80 or 90 lb. per 1000 gal.

New Publications

Electric Railway Dictionary.—Compiled by Rodney Hitt, under the direction of a committee appointed by the American Electric Railway Association. Bound in leather. Size, 9 x 12 in.; 292 pages. 1987 illustrations. Price, \$5.00 net. Published by the McGraw Publishing Company, 239 West Thirty-ninth street, New York City.

Every industry has a technical language peculiarly its own, and the terms and names of apparatus used cannot be found in any of the standard dictionaries. This is particularly true in the case of electric railway apparatus, and the result has been the creation of much confusion in ordering parts from manufacturers and in interpreting communications between railway companies. The compilation of this book was undertaken as a step toward the standardization of the nomenclature of the electric railway car construction, and the plan adopted was to define the location and purpose of a part in one section of the book and refer to an illustration of it in another part. In this way the definitions are arranged alphabetically, with numerous cross references, and a logical arrangement of illustrations is made possible. If a part has more than one name commonly applied to it the preferred name is defined and the other names are given in their proper places with a cross reference to the preferred one.

The illustrations are grouped together so that a logical arrangement is secured, the various types of cars being given, first commencing with small city cars and including large city cars, interurban passenger, combination and special cars, elevated and subway cars, snow sweepers and plows and sprinklers. This is followed by illustrations of car body framing and details including small hardware parts, registers, seats, brakes, lights, track scrapers, etc. The various types of trucks and their details are next given, with different types of motors and control apparatus succeeding them. Space is then given to miscellaneous electrical equipment and the various types of trolleys and trolley bases, together with two pages of engineering association standards, and this completes the second part of the work. As an aid in ordering parts from the engravings the manufacturer's name has been added below the title of each one.

Monoplanes and Biplanes. By Grover Cleveland Loenig. Bound in cloth. Size, 6 x 8 1/4 in.; pages, 340; illustrations, 278. Price, \$2.50 net. Published by Munn & Co., Inc., 361 Broadway, New York City.

The progress of aviation has led to a demand for a book giving a practical exposition of the subject, and in producing this work the author has made it his endeavor to present the subject of the aeroplane in a manner that is at once intelligible and of interest to the average man as well as of value to the student. After a brief historical introduction, in which the work of the pioneers in this subject is pointed out, the design of aeroplanes is taken up. The theory of aerodynamics is presented as simply and completely as possible, and the fundamental principles are fully explained and emphasized. A complete example of the design of a machine is given at the end of this section, and should prove of value to those who are actively engaged in construction of aeroplanes.

Monoplanes and biplanes in their forms are then considered, and detailed descriptions of virtually all the present successful types are given, supplemented by photographs and diagrams drawn to the same scale, which enables a graphic comparison to be made easily. The leading types are compared and discussed in the last part of the book and conclusions drawn from the results of actual practice, which enable lines of probable future development to be pointed out. In this section the causes of the numerous tragic, and in many cases avoidable, accidents, which constitute one of the greatest detriments to the progress of aviation, are pointed out and, as far as possible with the meagre knowledge available, means for their prevention are given. The final chapter deals with a variable surface aeroplane, a development that the author believes will be the next great step forward in the rapid progress of the art.

Heusler Alloys.—"Magnetic Properties of Heusler Alloys" is the title of an interesting bulletin issued by the engineering experiment station of the University of Illinois. The work was conducted by Edward B. Stephenson, and presents a complete description of experimental methods followed in the investigation of certain copper-manganese-aluminum alloys. The particular object of this work was to show a relation between the magnetic properties of the alloys, the chemical composition, and the molecular structure under heat treatment. While the facts established are limited in their significance, the means adopted for the control and measurements of temperature up to 1000 deg. C., the methods of thermal analysis as an aid to chemical analysis in the study of allotropic forms of the alloy and the methods used in developing the photomicrographic portion of the investigation are valuable. The bulletin is illustrated and may be obtained from the director of the university experimental station, Urbana, Ill.

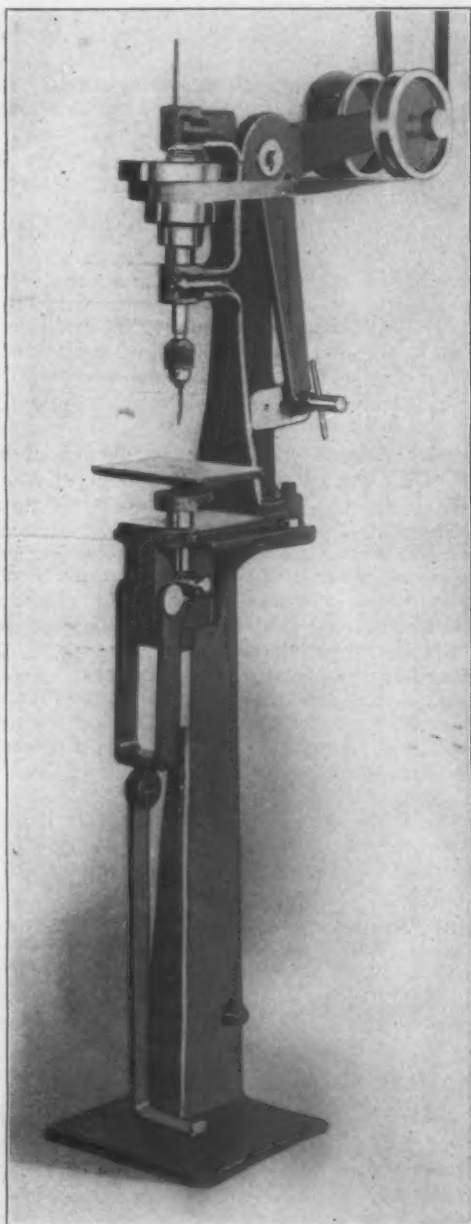
Metric System Tables.—The Bureau of Standards, Department of Commerce and Labor, Washington, D. C., of which S. W. Stratton is director, has issued the third edition of its "Tables of Equivalents of the United States Customary and Metric Weights and Measures." This is a publication of 50 pages, each 9 x 12 in., giving a large number of tables of equivalents, which are exceedingly convenient for ready reference. The equivalents have been carried out to the fifth decimal place and have been calculated up to 1000 units. Another publication of the same bureau, comprising 16 pages, gives a full description of the metric system, having been prepared to answer some of the more simple questions addressed to the bureau regarding the basis of the system and its use.

The Apollo Metal Calendar.—The Apollo perpetual metal calendar issued by the American Sheet & Tin Plate Company, Pittsburgh, in the latter part of 1910, proved very useful, meeting with such a demand that the initial supply was quickly exhausted. As many orders were received which the company could not fill, it decided to order a second lot, and the unfilled requests are now being cared for. An application from any user of sheets or tin plates in any form addressed to the company's advertising department, Imperial Power Building, Pittsburgh, will secure one. The calendars are intended for wall use. The base is 14 in. x 20 in. galvanized material, suitably stamped in colors, and contains a holder which supports movable japanned sheets for the months and days of the year.

The Townsend High-Speed Drill Press

The high-speed drilling machine illustrated herewith is designed by its builder, the H. P. Townsend Mfg. Company, Hartford, Conn., as a manufacturing tool. The characteristic feature is the substitution of a treadle for the hand lever, an arrangement which leaves the operator free to handle the work. No jig is necessary, as a lever handle can be substituted, the hands being available to operate it. The foot on the treadle is at ease, permitting sensitiveness of touch as in the hand lever machine. Owing to the facility in handling work it is estimated that 3/16-in. holes can be drilled through brass or bronze 1/4 in. thick at the rate of 50 a minute.

Instead of ball bearings a long cast iron bearing is employed, treated on the inner surface with a secret process



The Townsend Manufacturing Drilling Machine.

which impregnates the metal with graphite to a depth of 0.01 in. With this, it is claimed, a new machine will run 10 hours without heating at the rate of 3000 r.p.m. with one oiling.

The hole for the spindle and the table plunger are bored in line, and the table may be swung up in the center rest of a lathe and accurately faced off at any time. The simple belt tightening device is accessible from the front of the machine, so that changes of speed may be quickly made. The four speeds are in the ratio of 975, 1250, 1700 and 2375.

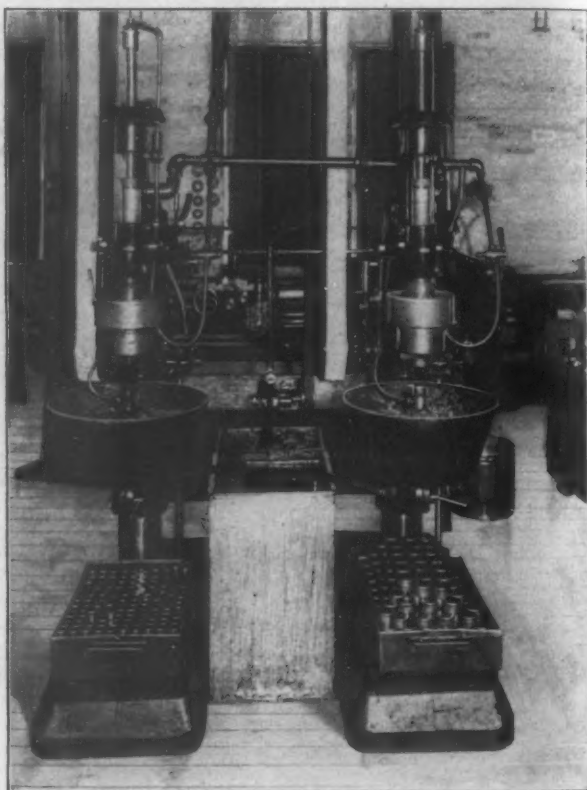
The adjustment of the table is secured by a stop collar underneath the bed. In addition a micrometer adjustment is provided. Several heads may be set in a row and a

weight feed applied for deep drilling operations where enough time is occupied to enable the operator to feed more than one machine. The specifications follow:

Size chuck.....	3/4 in.
Greatest distance bed to chuck.....	6 3/4 in.
Table raises.....	1 1/2 in.
Table adjusts.....	4 in.
Spindle adjusts.....	3 in.
Depth of throat.....	4 in.
Table size.....	6x8 in.
Tight and loose pulleys.....	5x1 3/4 in.
Driving pulley.....	12 in.
Speed of countershaft.....	575 r.p.m.
Floor space.....	12x24 in.
Weight, crated, complete.....	240 lbs.

Interesting Application of a Barnes Tapping Machine

The accompanying illustration presents an interesting job of machine tapping with two 20-in. all geared tapping machines. The pieces being tapped are pressed steel grease cups, an example of blind hole tapping by the inverted process; that is, the spindle is fitted with a Garvin pneumatic chuck which automatically grips and releases the caps without stopping the spindle. The work is then revolved down on the tap, which is held in a Colburn floating tap holder in a special cup type table. Oil is forced up through



Tapping Grease Cups in a Barnes Drill.

the center of the tap as shown in the machine at the left and serves a double purpose in forcing out the chips so that they may be free to fall.

These machines are built in 20- and 24-in. sizes by the Barnes Drill Company, Rockford, Ill., and follow the general design and specifications of this company's standard all geared drills. In fact, the tapping machine can be combined with the friction clutch gears and positive power feeds to make a drilling and tapping machine. The friction clutch gears give a reverse speed 1 3/4 to 1. They are located at the driving end of the machine rather than on the spindle.

The automatic reversing mechanism which is especially desirable for depth tapping is controlled with a trip so set as to automatically reverse the spindle at the desired point, backing out the tap at increased speed. The shifting lever may also be set so that when tripped automatically or by hand, it will return to a neutral position, thus stopping the spindle instead of reversing.

Four direct geared speeds and four back geared speeds, or eight changes in all, are available on this tool. The 20-in. machine will drive a 1 1/4-in. standard tap in cast iron without back gears, and the 24-in. will handle up to 2-in. pipe taps.

Reversible Direct-Current Drum Controllers

A new line of drum type controllers has been recently developed by the Cutler-Hammer Mfg. Company, Milwaukee, Wis. These are designed for use with direct-current reversible motors operating heavy machinery such as ladle, foundry and transfer cranes, ore unloaders and bridges, car dumpers and other apparatus found in steel mills, although they are also adapted for use where frequent starting and stopping is required, as is the case with many types of hoisting machinery. Figs. 1 and 2, which are exterior and interior views, respectively, of the controller used with 30 to 50-hp. motors, show the general construction of the line.

The principal features claimed for these new controllers are an ease of operation which permits the operator to feel all points of control, an even distribution of the magnetic flux, providing an effective blowout on each finger and segment, a hinged pole piece, increased accessibility to all parts, the use of arc deflectors and shields to prevent the burning of the finger board and the jumping of the arc from one finger to another, a new design of non-stubbing fingers and a large number of resistance steps, together with a special arrangement of the circuits in the controller. The cast-iron enclosing shell is weather-proof, and both the controller head and cover are removable. The copper segments are mounted on a rotating cylinder, and a finger board carries a number of fingers for making and breaking the circuits supplying the current to the motor armature for rotation in either direction and to produce smooth and easy acceleration by cutting out the starting resistance in a large number of steps. The tips of the segments and also the fingers are renewable, and the entire finger board can be taken out without removing the rotating cylinder upon which the segments that the fingers rub against are mounted.

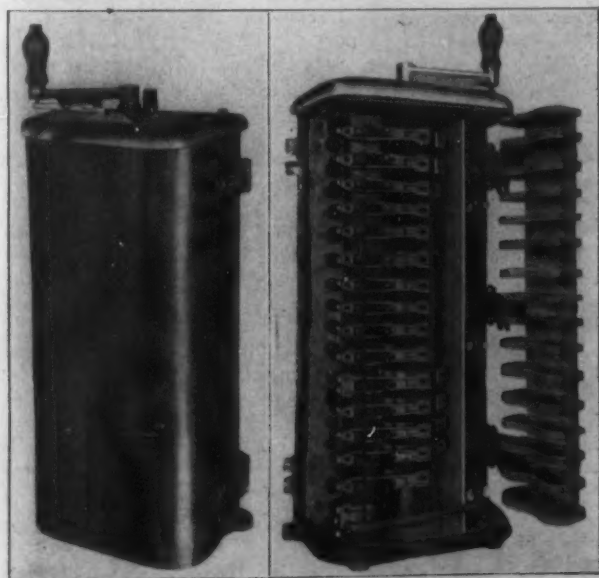


Fig. 1.—Exterior View.

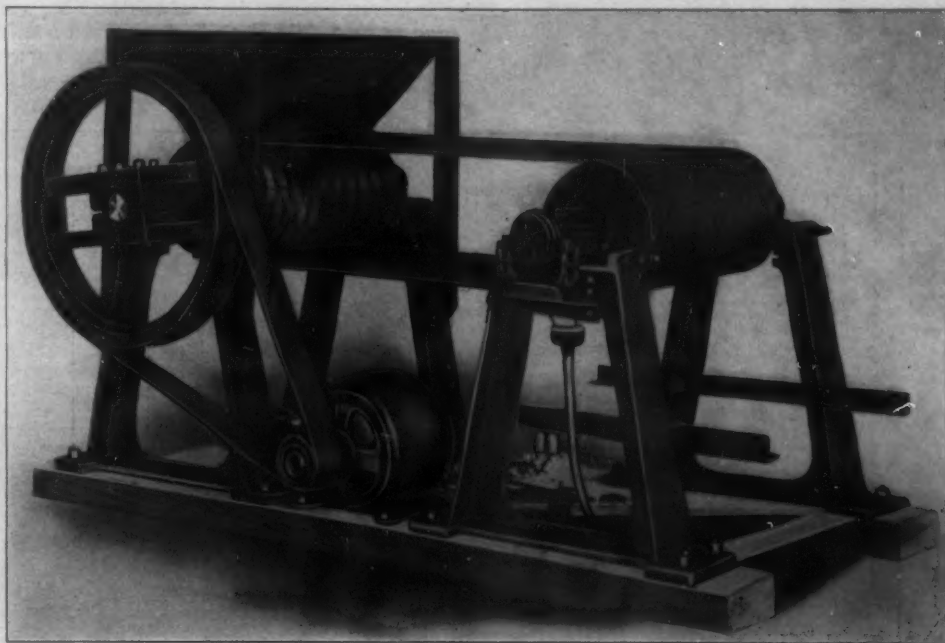
Fig. 2.—Interior View.

Two Views of a New Direct-Current Controller for Steel Mill Machinery, Built by the Cutler-Hammer Mfg. Company, Milwaukee, Wis.

These controllers are made in four sizes, having capacities of 50, 100, 200 and 400 amperes, the last having two fingers for each segment instead of one. The number of speeds available in each direction with these controllers are six for the lowest, seven for the second size and nine for the last two. The standard line of apparatus includes controllers for 110 and 220 and 500-volt direct-current motors. A part of this new line are full reversing and dynamic lowering types of controllers. Where a controller of the latter class is used it is stated that in many cases it is possible to control the speed of a descending load by varying the amount of resistance in the armature circuit so that its downward movement cannot be perceived by the eye.

New Magnetic Separator

For separating the magnetic material from mixture containing both magnetic and non-magnetic matter the



A New Type of Magnetic Separator for Coal, Rock and Ore, Built by the Cutler-Hammer Mfg. Company, Milwaukee, Wis.

Cutler-Hammer Mfg. Company, Milwaukee, Wis., has developed a new type of magnetic pulley or separator. The machine is especially designed for handling coal, rock, ore, etc., where it is essential that no large pieces of steel or iron enter the crusher. Other applications are the removal of iron shot from molding sand, separating magnetic ores and other work of a similar nature.

The magnetic pulley consists of alternate coils and steel disks concentric with the shaft, the latter being keyed thereto and supporting the steel spool foundations of the former by dowels. All of the coils are inclosed and protected by a cylindrical brass coil shield, which bears tightly with each of the two adjacent pole pieces. Carbon brushes held on a pair of slip rings by self-adjustable holders provide the necessary current for the coils.

The material to be separated is fed by a hopper to the conveyor belt running over the pulley. As the material passes over the pulley the magnetic matter is drawn toward the face, clinging to the belt until the latter reaches the point where it leaves the pulley on the lower side. Here it is snapped off into a chute or other conveyor which is installed to receive it. The non-magnetic material is projected for a considerable distance in front of the pulley, thus giving a clean separation, and if desired this can also be conveyed away.

The standard pulleys have but one diameter, namely, 12 in., but are built in lengths ranging from 16 to 36 in. The capacities range from 1340 to 3000 cu. ft. per hour and the current consumption from 325 to 750 watts. Any direct current voltage up to 250 will operate the separator satisfactorily. If desired pulleys having a diameter larger than 12 in. can be built to fill the requirements of special installations.

International Harvester Tractor Works

Design of a Large Plant at Chicago for Making Gas Power Farming Machinery—Special Machinery and Unusual Power Arrangements

Five years ago, when the International Harvester Company began to build gas tractors at its Milwaukee Works, the commercial demand for gas power farming machinery was in its infancy, and but little was known of this power for farm use. Now this company has under construction and in partial operation in Chicago a plant that will be devoted exclusively to the manufacture of this type of tractor. Ground was broken in 1909 and the progress of building is in accordance with a construction schedule which provides for completion in 1916. During the past six months the first sections of the forge and machine shops have been in operation on a capacity schedule of six tractors per day. With respect to the character of buildings and equipment this plant is representative of the most progressive types and already involves an expenditure of over a million dollars.

the forge shop. The work under construction and to be completed in 1911 includes an additional 240 ft. of the machine shop and 260 ft. of the forge shop bringing the length of each up to 500 ft. The steel framework of the machine shop addition is now erected and the machine equipment decided upon. The building of the foundry is scheduled for 1912. The necessity for crowding into the portion of the plant now built all of the operations involved in the complete construction of a tractor at present prevents the segregation of the several departments to the extent that will be possible later.

The ground plan shows the railroad spur which traverses the areaway between the machine and forge shops. This track is depressed between ground-level loading and unloading platforms and is spanned by a 12-ton yard crane. Material is brought to the end of the spur, and there is un-

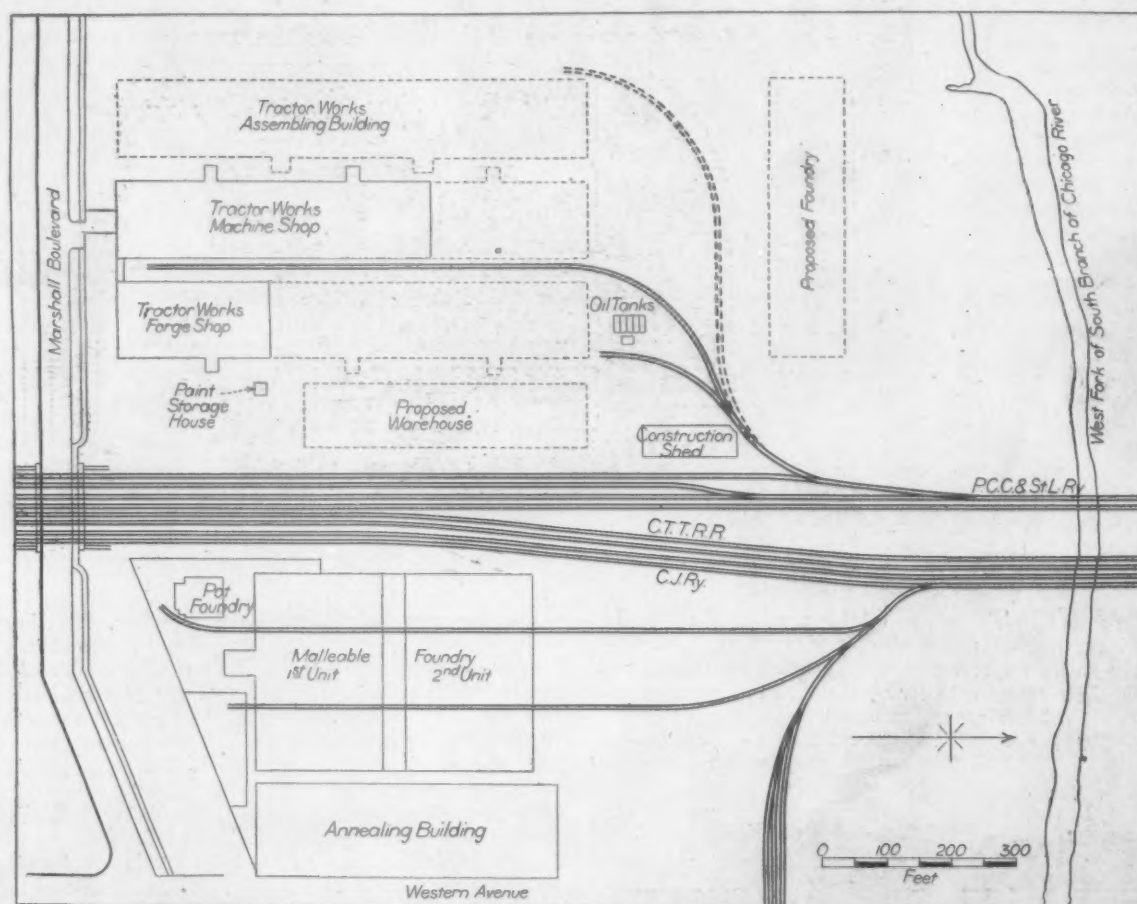


Fig. 1.—Ground Plan of Tractor Works at Chicago, International Harvester Company; Completed Buildings Are Shown in Full Lines.

The Tractor Works site adjoins the malleable foundry of the McCormick Works in Chicago. The plant as now projected is indicated in the layout, Fig. 1. The essential units comprise a forge shop, machine shop, assembling building and foundry. The first three buildings will parallel one another in a north and south direction, with a 40-ft. areaway between each building. Each of these buildings will be 760 ft. long by 120 ft. wide, and will be similar in the material and character of their construction. The foundry is to be erected to the north of the other buildings and at right angles to them. The relative location of the foundry as planned, with reference to the machine shop and general direction of the castings through the finishing process, is not so logical perhaps as it is expedient in the light of other previously existing considerations. The foundry will be 120 x 440 ft.

This article will confine itself to that portion of the shops and equipment now built and installed. This comprises the first 260 ft. of the machine shop and 240 ft. of

loaded either into the stockroom or directly into the south end of the machine shop, if it be parts for machining. At this end, where the raw material enters, the arrangement of machines, as illustrated in Fig. 2, provides for the grouping of the heavy tools. Set across the main bay are two Gray planers, one 42 x 42 x 16 ft., the other 48 x 48 x 10 ft., and a special Ingersoll duplex milling machine.

Along the columns, as also shown in Fig. 2, are six Niles boring mills, five of them 60 in. and one 51 in. and five 36 in. Bullard vertical lathes. All of these tools are independently motor driven. The Gray planers are primarily intended to handle the overflow from the milling machine which was designed especially for machining the engine crank cases. These housings require facing on top, bottom and four sides. For these operations, these four-head planers, with their large opening between housings, can be used very advantageously.

The special duplex milling machine built by the Ingersoll Milling Machine Company, Rockford, Ill., is illus-

trated in Fig. 3, and merits description in some detail. The table has a working surface 36 in. x 10 ft. It is a six-spindle machine, four upper spindles being carried in two rigid saddles, while the lower or auxiliary spindles are carried in special sliding saddles having a vertical adjustment of about 8 in. The four main spindles are 7 in. diameter, the other two $3\frac{1}{4}$ in. The quills for the main spindles are 12 in. in diameter and have 10-in. independent horizontal adjustment. The lower quills have a horizontal movement of 6 in. All-steel gears 20 in. diameter, 3 in. pitch and 4 in. face drive the two main spindles and are equipped with clutches for throwing in and out of rotation. The saddles may be bolted together by a tie plate for gang milling as illustrated in Fig. 4 and are equipped with power travel up and down. The cutters used vary in size from 7 in. up to 20 in. The cutters in the two center spindles are 18 in. in diameter and have faces 6 in. wide. They cut on both sides and face. The arbor mills shown in Fig. 4 are 7 in. in diameter and 9 in. of face, and are of the Ingersoll inserted-tooth slab milling cutter type. The entire machine weighs about 51,000 lb. and is driven by a 35-hp. variable speed motor.

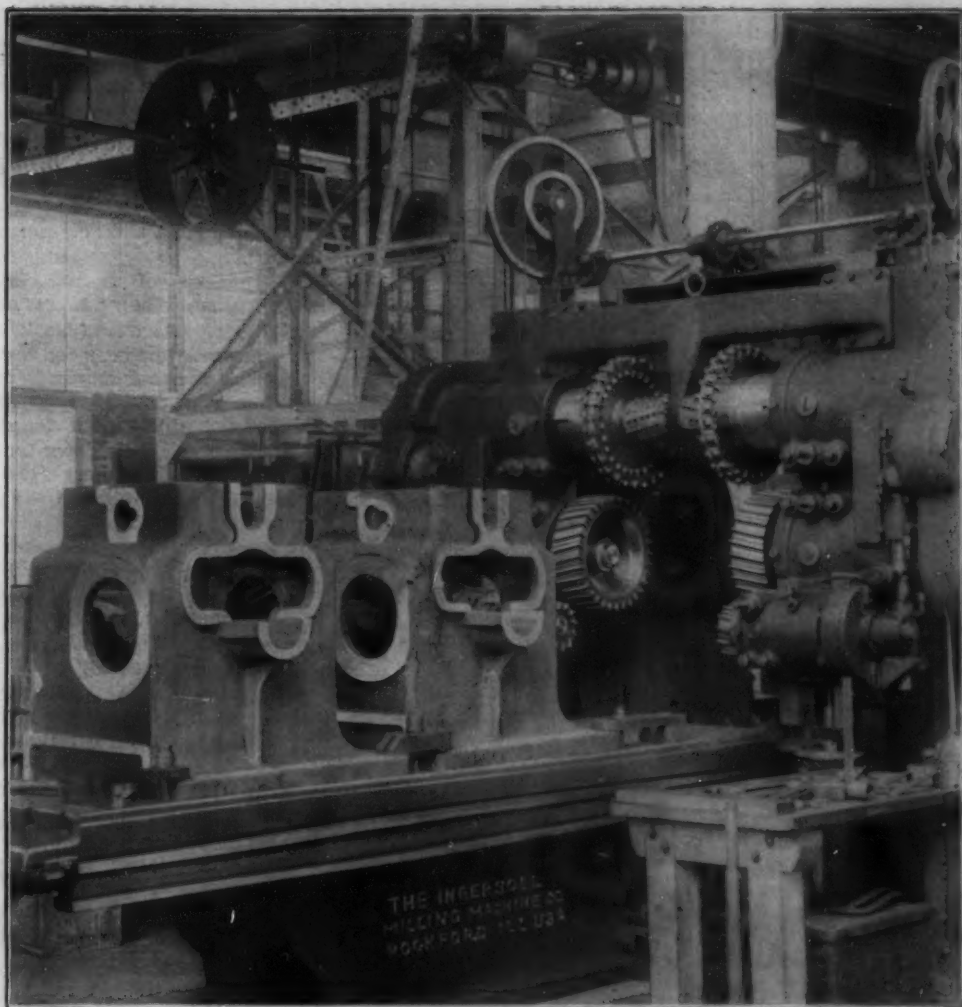


Fig. 3.—Special Ingersoll Milling Machine for Finishing Crank Cases.

Two operations are required for the complete milling of the crank cases. The first consists of milling the top and side pads. Seven cutters are used for this operation, the largest being 20 in. in diameter. A cut of $\frac{3}{16}$ in. of stock is made and 12 bases can be machined in ten hours. For



Fig. 2.—View of Machine Shop Main Floor, Looking Toward Heavy Tool Section at Which End the Work Enters the Shop.

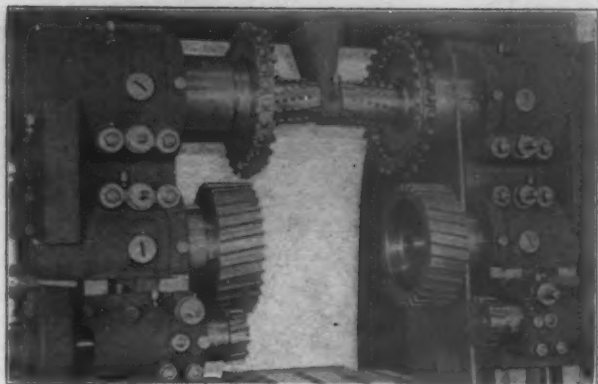


Fig. 4.—View of Spindles, Quills and Cutters of the Special Ingersoll Milling Machine.

the second operation, the housing is turned around at right angles and four cutters are used, the largest of which is that shown in Fig. 4. In this operation about $\frac{1}{2}$ in. of stock is removed and in 10 hr. fourteen housings can be finished.

On the 60-in. boring mills the flywheels and differential gears are turned and bored. The mills are set far enough into the middle bay so that the pieces to be machined can be handled on and off of the mill tables with the crane. The 51-in. mill is to be used for boring the engine cylinders. The Bullard vertical turret lathes are very flexible and adaptable for a variety of boring and turning operations on the smaller band and gear wheels. On the opposite side of the columns from this group, in the side bay, are arranged the group of milling machines which include six Cincinnati milling machines, one No. 3 high-power plain miller, one No. 3 vertical high-power, three No. 4 high-power plain millers and one No. 5 machine. With the exception of one keycutting operation, for which a 24-in. Gould & Eberhardt shaper is now being used, no shaper or small planer tools are included in the shop equipment. The machining of connecting rods, bearing brackets and boxes, housing doors and similar is done entirely on the milling machines. Practically all of the work is machined in jigs, and by using two and three cutters nearly all of the jobs are finished in one or two operations.

Two No. 2 Cincinnati-Bickford 5-ft. radial drills, new type improved, and one 36-in. Bickford plain radial together with a No. 1 Baker Bros. high-speed drill, are provided for the miscellaneous drilling. Most of the template drilling, as for the crank cases and gear spiders, is done on a Bausch horizontal multiple-spindle drill. The openings in the crank cases for bearings and cylinders are machined at present on a Lucas horizontal boring mill, but a special horizontal four-spindle machine is under construction with which it will be possible to finish all four openings in the crank case at one setting. The pistons, crank shafts, countershafts, and gear blanks are among the pieces handled on the heavier lathes, which group includes two 28-in. Pond Turret lathes, a 21-in. Gisholt, a 78-in. heavy duty Le Blond, a heavy duty American lathe, and a

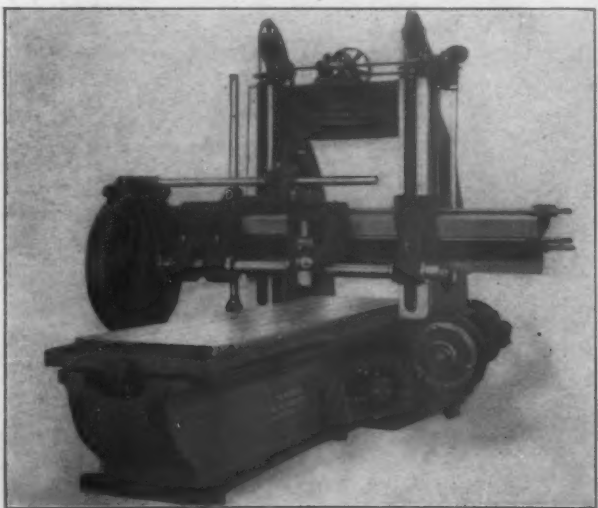


Fig. 5.—Ingersoll Horizontal Spindle Slab Milling Machine, with Special Vertical Spindle Attachment for Key Seating.

36-in. x 16-ft. Lodge & Shipley patent head high-speed engine lathe.

The slotting and tooth cutting of the differential and driving gears is handled in a group of machines, including a 15-18-in. Dill adjustable-head motor-driven slotter, a Lapointe Machine Tool Company broaching and keyseating machine, and two Gould & Eberhardt new type 64-in. x 20-in. steel motor gear cutter, motor driven. The finishing of the heavier engine parts is close to the north end of the east side bay, and here the engines are assembled ready for test.

The gallery of the machine shop extends across the south end and along the east and west sides of the building. At the south end is located the toolroom. It combines the machine equipment for the upkeep of the shop tools as well as the tool supplies. The west gallery, a view of which is shown in Fig. 6, is wide enough for a row of benches along the windows, a line of drill presses and miscellaneous small tools down the center and another row of benches along the gallery railing. The north end of this gallery is devoted to bench work for fitting and assembling the engine parts, such as the governors, connecting-rod boxes, pistons, valves and other parts.

The east gallery, shown in Fig. 7, is given over to lathe work suitable for Jones & Lamson and Bardons & Oliver type machines. This group also includes a Cleveland automatic machine, and two Landis bolt cutters, motor driven. At four points the floor of the gallery projects out under the crane providing 6-ft. landing platforms, and thus allowing the gallery floor to be included in the crane service. In addition an electric elevator is available for handling materials.

The shop tools are electrically driven throughout with alternating current motors. The larger tools are each individually driven, while in the side bays and galleries some of the smaller machines are grouped under belt drive from a common motor. The line shafting is equipped throughout with Hyatt roller bearings.

The steel to be worked up in the forge shop is received from the loading platform into the west side of the building at a point where it can be conveniently moved to the heavy cutting and pumping machinery in the center of the building. The heaviest pieces are for the steel tires. These pieces are 24 in. wide x $\frac{1}{2}$ in. thick, reinforced on both edges by a strip $1\frac{1}{2}$ x $\frac{1}{4}$ in., and are sufficiently long to permit rolling up into circles 73 in. outside diameter for the front wheel, and 40 in. outside diameter for the rear. Before rolling the tires are punched in a Cleveland Punch & Shear Works Company's multiple punch. This machine has a triple housing, spaced 100 in. within the outer housing, and has a 12-in. depth of throw. The stroke of the plunger is $2\frac{1}{2}$ in. and eccentric bearings are provided together with a mechanism for simultaneous operation, so that the stroke may be adjusted up to and including one inch. The machine weighs approximately 75,000 lb. and appears in the view of the forge shop, Fig. 8. The tires are rolled in a Bertsch tire roller, the rolls of which are 7 in. in diameter and 36 in. long.

The structural shapes for the tractor frame are received cut to length. They are punched in the forge shop, heated in a Rockwell bulldozer furnace and shaped to an O-G curve, in a bulldozer operated by hydraulic pressure. The wheel spokes are riveted into the tire, cold, on a special hydraulic spoke riveter built by R. D. Wood & Co., Philadelphia. For these two operations a hydraulic accumulator and pump yielding 1500 lb. pressure per square inch is installed.

The heating furnaces are Rockwell oil type of various sizes. The oil supply is maintained in tanks having a capacity of 10,500 gal., and the tanks are buried at some distance from the shop. The oil is pumped under a pressure of from 7 to 10 lb. The air for the heating furnaces is supplied from a 500-cu. ft. Root blower under a pressure of 2 to 5 lb. In accordance with Underwriters' requirements, the blower is connected up so that, when it is shut off, the oil pumps at the distant pump house are also automatically shut down.

The assembling of the tractor chassis, the testing of the engine, and the mounting on the trucks occupy the north end of the building in both bays. In connection with the tractors, it is interesting to note that all holes are drilled while the material is in the shop except those in the frame through which the engine housing is bolted on. These holes are drilled with an air drill with the engine in place.

The compressed air for drilling and chipping is supplied from a 500-cu. ft. Ingersoll-Rand duplex compressor equipped with regulator and driven by a squirrel cage type General Electric motor. The compressed air is also used for blowing the artesian well from which drinking water is obtained. The well is 1560 ft. deep, delivers 220 gal. per minute, and requires 95 lb. pressure to start.

Great care is given to the testing of the engines. Twelve testing blocks are installed, six in each bay. Between each pair of test blocks is a 50-kw. generator, to which the engine on either block can be belted during the test. Each of the six motors is supplied with a switchboard panel, connecting the generator output with a power system of the plant. Inasmuch as the test involves one day's run, light, and two with a load, before the engine is mounted on the tractor, it is possible by connecting up with these generators, to supply no inconsiderable amount of current. A difficulty arose, however, in that this current being intermittent required cutting in and out of the plant power

a step-up transformer and over a 440-volt line to the malleable foundry. Coincident with the building of the Tractor Works, a plan was evolved whereby the waste heat from the furnaces of the foundry, which at that time was going direct to the stack and being lost, could be diverted-through waste heat boilers and used for the generation of additional power. Six 400-hp. Wickes vertical tube boilers were installed to take care of an equal number of 14-ton furnaces. From the boilers, sufficient steam can be developed at 150 lb. pressure to yield from 1500 to 1600 kw., depending upon the number of furnaces working. For the generation of this current there are installed at present two turbo-generator sets, each of 1000 kw. maximum capacity. The Tractor Works, as a result, has four available sources of power—the Sanitary District, the malleable foundry waste heat plant, the wood mill shavings fuel plant, and the engine testing station. For plant distribution all of this current is, finally, three-phase, 60 cycle, and 440 volts.



Fig. 6.—View of West Gallery of Machine Shop, Where Light Machine Work, Bench Work and Assembling of Small Parts are Handled.

circuit. Conditions at the same time did not permit this test station to be connected in parallel with the other sources of power. To meet the situation a special double-throw circuit-breaker switch was devised and installed by means of which a testing station generator plant could be cut in so quickly as to avoid losing the speed of the motors on the line. The engines, rated at 45 hp., are also subjected to a brake test up to about 80 hp. After the engine is mounted and the tractor assembled in running order it is again tested under actual operating conditions.

For its power, the Tractor Works is tied in with the power system which supplies the McCormick Reaper Works, wood mills, and malleable foundry. The McCormick plant uses under contract a certain quantity of power from the Sanitary District sub-station (Chicago Drainage Canal), delivered to the Reaper Works, where it is stepped down from 20,000 to 440 volts. From the Reaper Works a portion of the current is carried over on a 440-volt line to the wood mills. Here it is augmented by current generated from a 750-kw. Allis-Chalmers turbo-generator, and two engine-driven units of 2000 kw. maximum capacity, the steam for which is developed by the burning of wood shavings. This combined source of power delivers through

The construction of the building for the factory work has been planned to conform in as great detail as possible with the requirements of machine shop and forge shop practice. The various building features also have been contrived to offer the greatest advantages in ventilation, sanitation, and maintenance. The machine shop is designed with a 60-ft. center bay and 30-ft. side bays. The center bay has a north light saw-tooth roof construction, of economical and substantial design. The bay is spanned by a 12-ft. crane. The gutters are formed with Hy-rib metal construction. To establish drainage from the center of the roof toward the sides of the building, these gutters are filled with cinder concrete $1\frac{3}{4}$ in. thick, pitched the necessary amount. Instead of down spouts a continuous concrete trough is built along the edge of the roof, into which the saw-tooth gutters drain. This gutter is also a cinder concrete formation reinforced with Hy-rib construction and lined with 16-oz. copper sheet. The heat from the building serves to prevent freezing or collection of snow in these gutters during the winter season.

The side bays of the machine shop are high enough to permit galleries as mentioned above, on which the light machine work is done. The main floor of the shop is laid

on 5 in. of concrete, moist-proofed, with tar wash and tar paper. Sleepers $1\frac{3}{4} \times 6$ in. are laid in this concrete, and on these sleepers, matched pine flooring $1\frac{3}{4}$ in. is laid with a $\frac{7}{8}$ -in. hardwood finish above. In the galleries a similar wood floor has been found preferable to asphalt prepared floors. The window lights in the present building, both in the saw-tooth roof and sides of the building, are operated by the Pond continuous system furnished by the David Lupton & Sons Company of Philadelphia. In the new addition the United continuous system is being installed by the Trussed Concrete Steel Company, Detroit. The Pond system as applied to the roof sashes controls the opening

and closing across the entire width of 60 ft. in one operation.

Like the machine shop, the forge shop is entirely steel construction, but with a different roof design intended for the better carrying off of smoke and gases arising from furnaces and forges. The building is arranged in two bays, each 60 ft. wide, with a 12-ton crane in each bay. The crane runway rail is 32 ft. above the floor, which permits one assembled tractor being raised sufficiently high to be carried over other tractors on the floor. This gives considerable flexibility to the erecting floor. The roof trusses of this building are noticeable because of the large pitch of the roof. This slope serves a double purpose of eliminating smoke pockets under the eaves, and also conforming to the requirements of a tile roof. The roof of the forge shop is covered by a cement tile made by the Federal Tile Company, Chicago.

The heating and ventilating system of both machine and

forge shops has been worked out with great care. The indirect system is used with a Garden City blower installation. In the machine shop a fan and set of coils are located on each side, and the hot air is forced through underground pipes, which emerge at the base of the column on either side of the center bay, and discharge the hot air upward into the center of the shop from a point near the floor. The circulation of the hot air is upward to the roof in the center across to the sides under the eaves, and down through openings in the gallery floor, along the side walls, returning to the blower suction. In the forge shop, the system of heating is similar except that the direction of circulation is reversed—the air arising along the side walls and descending in the center of the shop. In warm weather a circulation of the air is obtained through the heating apparatus, and it is expected that the direction of circulation in the forge shops will aid in moving the smoke up to the

roof monitor, and out through the ventilators. The Tractor Works is heated from the waste heat plant at the malleable foundry of the McCormick Works, a description of which is given in connection with the power features of the plant.

Of particular importance in the forge shop is the system of floor conduits for carrying all water, gas, oil, and air pipings. These conduits, which are covered by cast-iron floor plates, were laid in the floor during construction at intervals sufficiently frequent to make all desirable portions of the building accessible. The piping at that time required was laid in these conduits, and any additions to the piping system can thus easily be added without fear of overhead interference.



Fig. 7.—View of East Gallery of Machine Shop for Automatic, Turret and Small Lathe Work.



Fig. 8.—View in West Bay of Forge Shop, Where Stock is Received and Heavy Punching and Shearing Machinery is Located.

The offices of the Tractor Works, the engineering department, wood-working shop, and stockroom are now included in the south end of the machine shop building. As the buildings are completed this arrangement will be changed, affording more room for the engineering department and the storeroom. The stock room will have on the one side an entrance from the railroad track between the building, and on the other side from a team-loading plat-

A New Method of Making Square Tubing

The Heinle Company, metal-rolling engineer of Crafton, Pittsburgh, Pa., is furnishing roll designs disclosing a new and practical method for reforming cold flat steel strip into square tube sections. The reforming of the flat sheet into a square tube is accomplished in three roll passes, by the rolls exclusively, and without the use of a mandrel.

Heretofore forming of this kind has been confined to pressing, which is prohibitive to long lengths of tube, while rolling permits double lengths and longer.

The joint of the tube is located in the center of the side wall, half way between the corners, and can be butted or slightly opened as required. The joint can also be located off the center. On account of the light gauges of material, electric welding or brazing is the means used to close the joint.

Cold forming, from $1/32$ in. in thickness for the smaller tubes to $5/64$ in. in thickness for the larger tubes, is practicable, the tubes running in regular sizes from $1/2$ in. to 2 in. square outside diameter.

This method of making light tube for agricultural, ornamental and bedstead fabrication is claimed to be far more economical than squaring round seamless tubing. The method of rolling can also be used for forming triangular, hexagon and rectangular tubes of iron, steel, copper and brass.

Steam-Hydraulic Forging and Bending Press Catalogue

The Mesta Machine Company, Pittsburgh, Pa., has issued an artistic 24-page catalogue of steam-hydraulic quick-acting forging and bending presses. These presses are built exclusively by the company for the United States and Canada, under the Haniel & Lueg patents. The system adopted in their design has a number of important features, one of the principal being that the press is self-containing; that is, the steam and hydraulic cylinders are directly connected to each other and the water in the press cylinder does not have to be forced through pipes when the press is in operation. This allows the press to be operated at higher speed and eliminates high-pressure piping between the intensifier and the press. A decided advantage is gained by having the intensifier directly connected and self-contained instead of having it placed on the floor near the press, where it would obstruct the handling of material. Sectional views are given, showing the interior construction, while illustrations are presented of the various types employed for special purposes.

It is conceded that forging presses are rapidly taking the place of steam hammers for many classes of work. The steam-hydraulic quick-acting forging press has therefore been adopted by the Mesta Machine Company, which has such extensive and well-equipped machine shops for handling heavy machinery that it is exceptionally fitted for undertaking this additional class of work.

The Bettcher Mfg. Company, Cleveland, Ohio, has added a line of chain links for use as sprocket chains for agricultural and hoisting work. The company manufactures washers, riveting burrs, felloe plates, corrugated copper gaskets, metal stampings, etc.

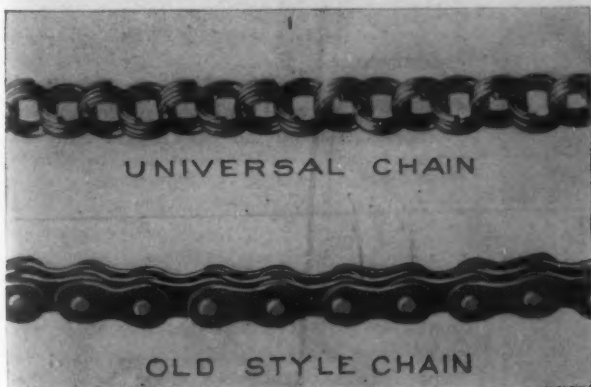


Fig. 9.—View in East Bay of Forge Shop, Showing Hammer and Heating Furnace Department.

form. The stock room is equipped with all steel adjustable shelves, each compartment marked with the name and size of the material in stock. All of the locks used in the building are a part of a Yale & Towne master-key system. This system extends not only to the doors of the building but also to the steel lockers which are supplied for all of the workmen.

A Universal Chain Oil Feed

The Spencer Wire Company, Worcester and Spencer, Mass., has developed a universal chain, shown in the accompanying illustration, for producing a circulation of oil in large bearings in manufacturing plants. The chain cannot kink and carries a large flood of oil. It is spliced



The Spencer Wire Company's Universal Chain Oil Feed.

together by hand in the same manner as slipping a door key on a split ring, no rivets being necessary nor any special coupling link or bolt. The bearing of the chain on the shaft is sufficient to insure continuous driving.

Large Castings in Fast Time

An Instance of Resourcefulness and Reliability in Repairing the Prinzess Irene

Let the daily newspapers announce a "Trans-Atlantic Liner Aground in Fog" and immediately the attention of the reading public is arrested. The detailed account is eagerly read, and each succeeding issue of the papers is care-



Castings B of Stern Frame.

fully scanned for news of the progress made toward floating the ship. But with the publication of the account of the vessel's release general interest ceases, and the matter is given very little, if any, further space in the daily papers.

But then, in the more serious cases, the real work—that of getting the ship again in condition for service—



Casting A of Stern Frame.



Casting C of Stern Frame.



The Prinzess Irene on May 17: Remaining Portions of Broken Frame Cleared Away, the Rudder and Propellers Unshipped and Ship Ready to Receive the New Stern Castings.

is just beginning. A recent instance is that of the North German Lloyd liner *Prinzess Irene*, which went aground off Fire Island on April 6. The record made in repairing the ship is too remarkable to be allowed to pass unnoticed.

Before the vessel was released from the bar on April 9 it was known that her stern was so badly damaged that an entire new frame would be necessary. This meant the construction of new patterns, the production of three rather large castings and, of course, the virtual rebuilding of the entire stern, but the Newport News Shipbuilding & Dry Dock Company, to which the contract for repairs was awarded, agreed to complete the work and have the ship ready to sail from New York on May 27. As the ship had first to be taken to her dock at Hoboken before she could proceed to the shipyard, this delivery could be made possible only by an extraordinary record in the production of the castings, and arrangements were made with the Thurlow, Pa., works of the American Steel Foundries to take the patterns in hand immediately upon their arrival and to ship all three castings within seventeen days thereafter.

The *Prinzess Irene* reached Newport News at noon on April 16, went into the drydock an hour and half later, and the work of removing the broken frame was immediately begun, as certain dimensions had to be procured from the old castings before the patterns for the new ones could be finished. Following the removal of the old frame, the patterns of the new one were rushed to completion and shipped by express. Molding commenced the day of their arrival at the plant of the American Steel Foundries, and subjoined is given a tabulated record of the progress of the work and the shipping weight of each casting.

Molding Record of the Three Large Castings.

Piece.	Pattern received.	Finished molding.	Cast.	Shipped.	Weight.
A.....	April 25	April 29	May 1	May 9	30,520 lb.
B.....	April 25	April 27	April 29	May 6	23,540 lb.
C.....	April 25	April 28	April 30	May 6	19,110 lb.
Total					73,170 lb.

It was essential from a shipbuilding standpoint that pieces B and C be delivered first and at the same time, and these were given preference over piece A and shipped 11 days after the arrival of the patterns. Each of these castings was subject to rigid specifications of Germanischer Lloyds, and an accompanying table shows the results of the physical tests. The bending test is especially severe, and

Sulphur in the Air and Metal Corrosion

The presence of sulphur gas, the relation of sulphur in the atmosphere and other considerations having an effect on the corrosion of metals were made the subject of a paper read before the Iron and Steel Institute by Percy Longmuir. The author listed observations made in regard to the chlorides and sulphates in the rain collected in different cities, the basis of the investigation being that the rain gives in general terms an index of the atmosphere through which it falls though the results are, of course, general rather than particular.

As indicating one of the sources of the presence of sulphur in the atmosphere, the paper gave the percentage of sulphur found in the soot in kitchen chimneys, locomotive and locomotive crane chimneys and general house chimneys. In the soot from ordinary domestic grates, the sulphur contents varied from 2.26 per cent. to 7.17 per cent. Soot from locomotive cranes showed variations, but the sulphur contents of the soot was an item which, the author felt, could not be ignored.

With regard to the deposit left as a result of corrosion, the example was taken of brass corrosion in which the deposit contained 28.65 per cent. of anhydrous sulphuric acid. In this case illuminating gas fumes were absent. Many samples of ordinary iron rust showed that one of the distinct features was an appreciably high content of

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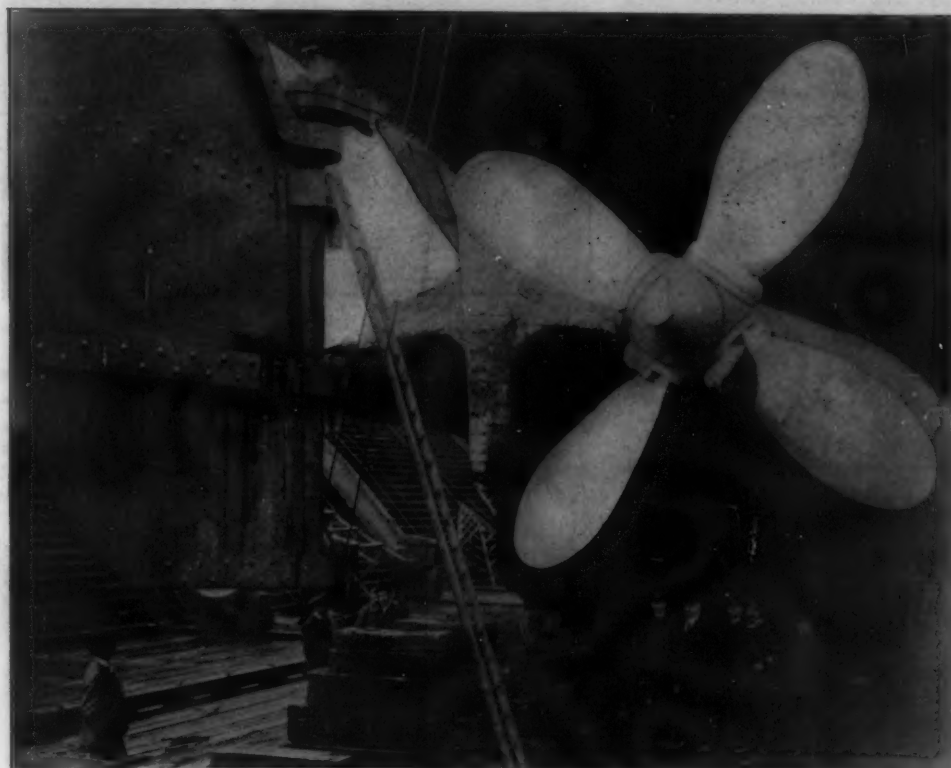
sulphur. This was found to apply only to rust resulting from atmospheric action.

The next step taken by the author was to study the confined atmosphere where coal was burnt, like the interior of railroad tunnels. Analyses were made of the tunnel air, also of the water coming from the tunnels. The tunnels all contained sooty deposits on the side walls, and a sample gave 2.83 per cent. sulphur. Corroded deposits from the rails in the tunnel gave 2.89 and 3.68 per cent.

Brittleness Developed with Rail Corrosion

The evidence of chemical change, the author admitted, was not easily found, nor was it easy to account for the brittleness induced in steel when subject to corrosive action. Observations and tensile tests of rails used in tunnels indicated that they become seriously embrittled, and the effect is intensified in damp tunnels. The author offered no hints on how the brittleness progresses into the interior of the rail, and stated that while the whole of the results show the embrittling effect, no two samples were precisely alike, and he was unable to trace any regularity in the order of development of brittleness.

The Brown & Zortman Machinery Company, whose warehouse at 2545 Liberty avenue, Pittsburgh, Pa., was recently partially destroyed by fire, has removed its offices and stock of new and second-hand machinery to 2845 Smallman street, where it has secured a building about 100 x 100 ft., having switching connections with the Pennsylvania Railroad. The building has a concrete floor and is provided with galleries for storing countershafts, pulleys, etc. The company is now handling all its business from the new location, and, in addition to other lines, represents in Pittsburgh and vicinity the Modern Tool Company, Erie, Pa., builder of plain and universal grinders.



Vessel in Dock on April 19 Minus Portion of the Stern Frame.

the two 1 x 1 3/16-in. specimens from each casting subjected to this test were all bent through an angle of 180 deg. over a 1 1/2-in. radius without the semblance of a flaw.

Physical Characteristics of the Castings.

Piece.	Tensile strength.	Elongation in 4 in.	Bending bar 1 x 1 3/16 in.
A.....	66,380 67,220	26.50 per cent. 28.00 per cent.	180 deg. 180 deg.
B.....	69,380 69,380	29.00 per cent. 29.25 per cent.	180 deg. 180 deg.
C.....	70,880 67,400	25.00 per cent. 26.00 per cent.	180 deg. 180 deg.

The first casting was machined and placed in the dock for fitting to ship on May 18. The work was completed and the ship left the dock at 11:30 p. m. May 24 and sailed from New York on its regular schedule at 11 a. m. May 27, having lost only one round trip. Among the passengers was A. I. Findley, editor of *The Iron Age*.

Carlin Contracts.—The Thomas Carlin's Sons Company, Oliver Building, Pittsburgh, with plant on the North Side, is running its boiler shop on a contract for large melting kettles, steel tanks and storage bins for a new asphalt plant at Pittsburgh, 60 rectangular tanks and a number of cookers for a preserving company, and other general contracts as follows: One 25 hp. hoist and derrick for yard use for an Eastern steel company; two latticed steel derricks for an Eastern contractor; a 9-ft. dry grinding pan for a foundry; a No. 61 shear to cut 2 3/4 in. square, driven by a Westinghouse motor, for shipment to Baltimore; small shears for scrap use, mill castings, etc. The company recently shipped a medium-sized shear to the Provincial Iron & Steel Company, Coburg, Canada, and is now building for the same company a special machine for straightening rolled sections.

Modern Steel Products Warehouse

The Plant of the Charles J. Stevens Company,
Chicago, Which Includes Hardening
and Annealing Room

An opportunity for illustrating the equipment of the modern warehouse for handling tool steel, steel tubes, wire and other steel products is afforded in the new structure of the Charles J. Stevens Company, Monroe and Jefferson streets, Chicago. In short, the following is offered as describing what may be regarded as progressive ideas in warehousing, storage and handling of steel.

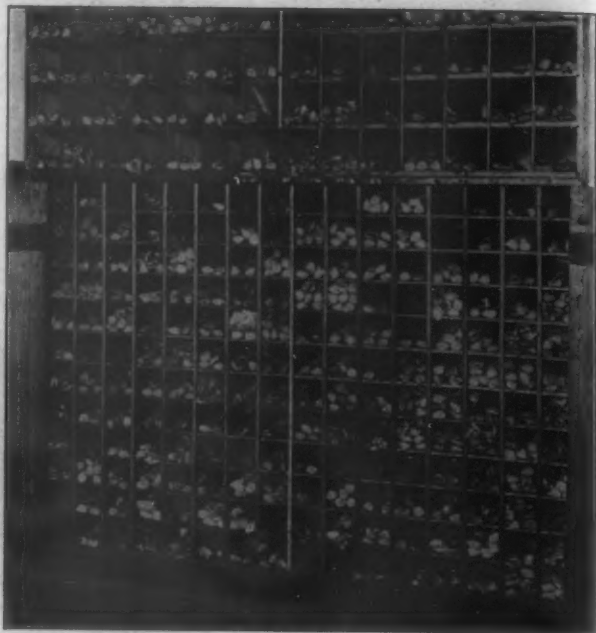


Part of Flat Wire and Strip Steel Storage.

One prominent feature is the extent to which tool steel and cold drawn and seamless steel tubes are stored in horizontal racks, each size in a separate labeled compartment as distinguished from the plan of standing such material on end along the wall. The arrangement allows for easy handling of the individual piece and makes a thorough inspection of the stock a simple matter.

The practice has also been adopted of separating each kind of material for shipment either into large tonnage quantities or in small amounts from broken packages. For small shipments one piece may be taken out of stock as easily as a dozen. For a large shipment the material is kept in the original package from the mill and so handled direct to the customer. By this general method of classification material is practically at hand in just the shape desired by the customer and a minimum time is required for shipment and delivery. Machine saws are installed so that steel in any length can be quickly furnished.

The illustrations showing the hardening and annealing room are deserving of special at-



Pigeon Hole Storing of Drill Rod Steel.

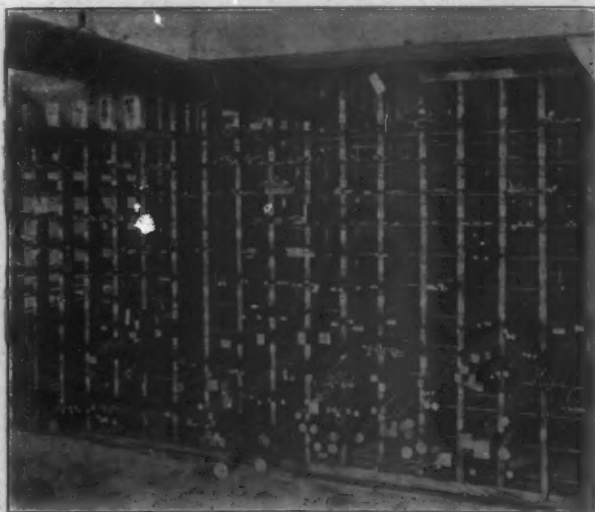
tention. For the convenience of customers and for the purpose of demonstrating by actual trial the properties of the steel handled, a hardening, annealing and testing equipment is installed. The furnaces include a large Brown & Sharpe case hardening and annealing unit. Electric pyrometers for the automatic control of heat



Section of Clock Spring Steel.



Music Spring Wire Stored in Coils.



Cold Drawn Steel Stored in Pigeon Holes.



Tool Steel in Horizontal Storage Arrangement.

treatments are installed and to an unusual extent for the steel warehouse the opportunity is presented for investigating the qualities of a given material. The installation is of special value, especially in relation to tool and special steels.



Corner in Hardening and Annealing Room.

The warehouse provides a floor area of about 50,000 sq. ft., but the company also operate a warehouse in which 2500 tons of steel are regularly carried.

The company began operation in 1896 and is the outgrowth of Mr. Stevens's personal connection as representative of the West Leechburg Steel Company, the Globe Wire Company and the R. H. Wolff Company, Ltd., now the Washburn Wire Company. The incorporation of the Chas. J. Stevens Company took place in 1903, and the additional connections and enlarged field of operations have been developed since that time, so that now the company is western agent for the following:

Henry Disston & Sons, Inc., Steel Works, Philadelphia; Hobson, Houghton & Co., Ltd., Sheffield, England; Globe



Another View of Case Hardening Furnace.

Wire Company, Ltd., Sharpsburg, Pa.; West Leechburg Steel Company, Pittsburgh; West Penn Steel Company, Brackenridge, Pa.; Pittsburgh Steel Products Company, Monessen, Pa.; Washburn Wire Company, New York City, and Standard Steel Tube Company, Toledo, Ohio.

The great transatlantic liner Olympic, which completed her first trip to New York June 21, marks an enormous advance in steamship tonnage. The registered tonnage is 45,000; length, 882 ft.; height from keel to boat deck, 97 ft.; height of the funnels above the casing, 72 ft., and distance from keel to funnel tops, 157 ft. There are 11 steel decks and 15 watertight compartments. The electrically operated rudder weighs 100 tons, the anchors 22 tons, and each line of the anchor chain links 175 lbs. An enormous quantity of rivets, 3,000,000 in number, weighing in all 1200 tons, was required in her construction. The ship represents an investment of \$10,000,000.

Hill Rail Fastener for Steel Ties

A device for holding rails to structural steel ties of the I-beam type was patented some time ago by W. W. Hill of the Duquesne works of the Carnegie Steel Company and the accompanying illustration has been prepared to outline briefly the features of the fastening, the publication of the description coming after the invention has successfully withstood hard service in the Duquesne Works' railroad yards.

The device consists of a hollow malleable casting filled with wood, into which an ordinary railway spike is driven through holes in the top flange of the tie. The casting has a short lug on the bottom which goes through a hole in the base of the tie and holds the casting in exact position for receiving the spike. This hole in the base of the tie is made large enough to allow the spike to be driven straight through should the spike head break off in driving. The malleable casting has a wall $\frac{3}{4}$ in. thick into which the wood core is inserted.

By this method of fastening bolts, clips and nut locks are eliminated, and, it is emphasized, it makes track laying and rail renewing quicker and easier than with any other fastening and the equal of the case when wood ties are used. In rail renewing the spike can be withdrawn by using the ordinary claw bar and the spike hole replugged as with all wood ties. Practical demonstration has been



Hill Rail Fastener, One View Showing Wood Center Pierced by Spike

made where ten rails were renewed on a 21 deg. curve in 45 minutes. The same spikes were used, the ballast not being disturbed. The soft wood tie plug was the only thing needed.

In pulling tests it was found that with the wood filled malleable casting it required 4,900 lb. to pull the spike, and by replugging and re-driving the spike it required 5500 lb., exceeding the pull required with the best white oak tie. In street railroad work, where the ties are embedded in concrete, the device is particularly well suited, it not being necessary to disturb the concrete when renewing the rails as is the case with all other forms of fastenings.

Over 7000 steel ties with the Hill fastening have been installed in the yards of the Duquesne Steel Works of the Carnegie Steel Company, Pittsburgh, Pa., some on 21 deg. curves and all under very heavy traffic conditions of over one year's service. Mr. Hill considers the record as fully demonstrating their practicability. In track construction it is found that the track can be shifted and lined as easily as with wood ties, not being stiff or unyielding. It is held that the oak tie in conjunction with the ordinary spike constitutes the ideal track and the closer the approach to this condition the nearer the ideal condition.

The Hill fastening, it is stated, is very simple and economical to manufacturers, each casting weighing about 1 lb. and the entire expense per tie, including the spikes, not exceeding 25 cents.

The commission appointed by the President under act of Congress to examine into the general subject of the cost of the handling and transportation and the rates of second-class mail matter will begin its sessions in the court room of the Circuit Court of Appeals, Post Office Building, New York, Tuesday, July 18, at 10:30 a. m. Those persons and organizations desiring to be heard are requested to file notices of their appearance with Colly W. Bell, secretary to the commission, Colorado Building, Washington, D. C., on or before July 19.

Improvement in Feed Water Heating

Details of the Cookson Heater

Ordinarily the exhaust steam purified by the oil separator of an open feed water heater is merely sufficient to raise the temperature of the feed water. In such case if it is desired to keep the interior of the heating system from fouling or to use the condensation from a hot well or receiver a second separator must be installed in the line. To remedy this condition the Bates Machine Company, Joliet, Ill., has brought out a new type of the Cookson cast iron feed water heater which is equipped with an oil separator large enough to purify the entire exhaust from engines and boilers having the maximum capacity that the heater can serve. Figs. 1 and 2 are ex-

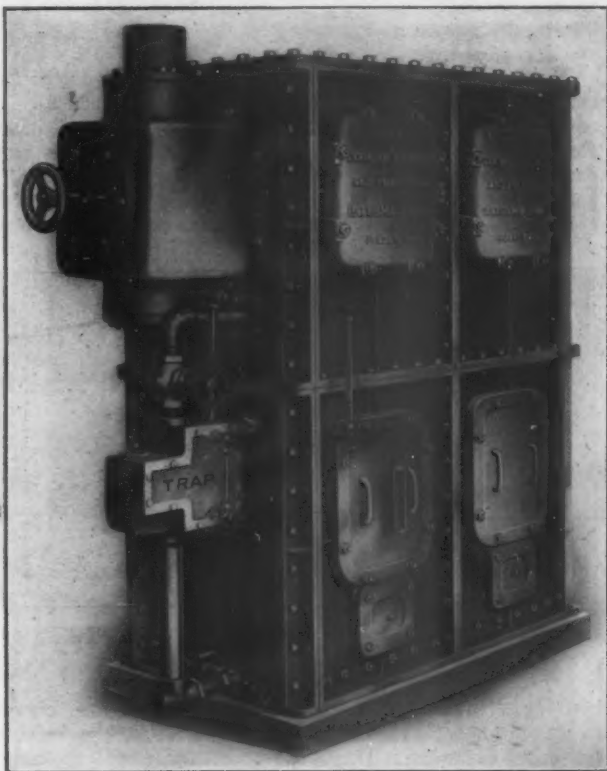


Fig. 1.—Exterior of the Cookson Heater and Purifier, Made by the Bates Machine Company, Joliet, Ill.

terior and interior views of the heater respectively, while Fig. 3 is a diagrammatic cross-section illustrating the principle upon which the heater operates.

This heater is made with a cut-out valve in the separator which enables the former to be cut out for cleaning without interfering in any way with the functions of the oil separator. It also is provided with exhaust inlet and outlet connections which are located in a direct line, an arrangement that permits the heater to be inserted in a vertical exhaust line with no disturbance other than the removal of a short length of pipe to accommodate the separator. This construction greatly reduces complications in piping, valves and fittings and also in the labor of installing. Where all the exhaust comes through one large pipe to a number of heaters, as in the case in many plants, a minimum number of pipe bends have to be installed to make the heaters deliver into a common stack and any of them can be cut out for cleaning while the others remain in operation.

Purifying the Steam

The separation of the entrained oil and water from the steam is accomplished by a change in the direction of the steam current and allowing it to expand. Exhaust steam enters the separator from the bottom and leaves through an outlet at the top, its course being clearly indicated by arrows in Fig. 3. As the steam leaves the exhaust inlet pipe it passes first through a tube projecting inwardly on the outlet flange and cut with a bevel on its upper end so as to open opposite the opening on the heater inlet tube near the upper left corner.

The steam is then divided by a V-shaped cast iron baffle plate on the under side of the heater inlet tube which deflects the current of steam to the separator walls. The currents make almost a right-angle turn and must travel back again to the center of the separator before they reach the inlet tube to the steam chamber of the heater. In the meantime the particles of oil and water by reason of their greater weight are dashed against the walls of the separator, which are ribbed throughout their entire area in both directions. These ribs carry the oil and the water down into a well formed around the inlet tube but out of the path of the steam current. This well drains through a balanced float trap and empties into the heater overflow pipe. If there is no pressure within the heater to require the use of a trap, a water seal can be employed instead. Since the oil drain connects with the overflow below the valve in this pipe it is possible for the separator to drain through the trap when the heater is cut out and the overflow valve shut to prevent the entrance of steam from the separator drain into the heater through the overflow pipe.

All of the steam that does not go to the heater passes through a tube on the exhaust outlet, which is similar to that on the exhaust inlet. The bevel, however, on this opening is cut in the opposite direction to the one on the inlet, thus compelling the steam to travel in a direction opposite to that in which it entered. This tube also prevents any water or oil that might travel upward on the inside surfaces of the separator casing from mingling with the outgoing steam. The steam for the heater

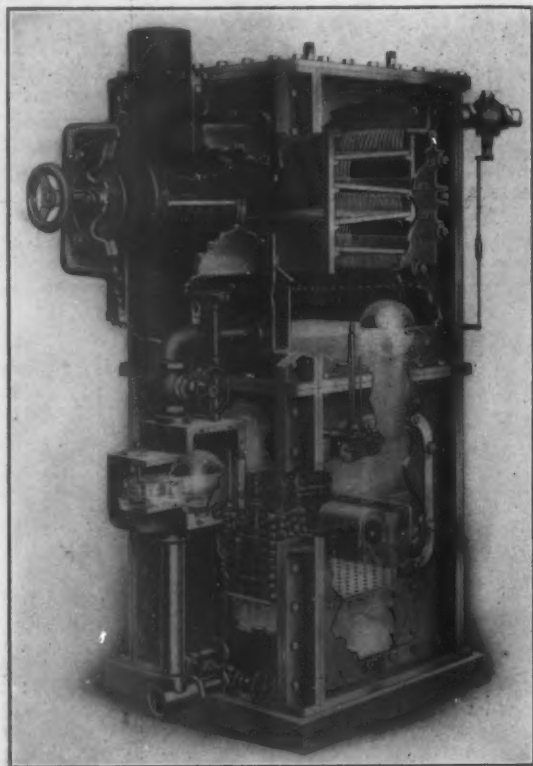


Fig. 2.—Interior View, Showing the Arrangement of the Various Parts of the Heater.

passes through the horizontal inlet tube. This tube is faced on its outer end to form a tight seat for a valve which is actuated from the outside of the separator to regulate the amount of steam passing to the heater. The vacuum or the induction principle is employed to draw steam into the heating chamber by creating a partial vacuum due to the condensation of the steam in the chamber and this is assisted by each exhaust of the engine, which tends to drive steam into the heater.

It is claimed by the maker that the cut-out valve construction used in this heater is simpler and less expensive and easier to maintain than the other mechanisms intended to accomplish the same purpose. Both the overflow and the separator cut-outs are standard globe valves which are positive in their action. These valves have flat seats with disks held in place both by positive acting parts and the pressure of the exhaust steam, an arrangement which causes them to close so tightly as to eliminate

any possibility of steam leaking into the heater after it has been cut out and a man is working inside cleaning. Should any trouble be experienced with either of these valves on account of leakage, the seats, since they are flat, can easily be reground. If desired the separator valve can be removed by loosening the six clamping bolts which hold it in place as shown in the upper left corner of Fig. 1. When this flange has been loosened the valve comes out easily without taking the separator apart or disconnecting any of the pipings.

Heating the Feed Water

The cold water enters through the inlet at the upper right corner, Fig. 3, and passes through the spray box, which has a baffle plate directly opposite the opening. The water flows over the edge of this plate upon a short horizontal extension of the bottom of the spray box and falls in small streams to the top heating tray. These trays are set in the heater at a slight angle, one above the other, and the water flows over each in turn in a thin layer and finally passes into the reservoir. The oil-free steam entering from the oil separator surrounds the

efficient to take care of any sudden large discharge of water into the heater, as from the steam traps or slugs from the heating lines. A float-operated trap in the overflow line having an opening as large as the line itself automatically lets this water into the waste pipe without admitting any air into the heater or allowing any steam to escape. It is thus possible to remove oil or other impurities floating upon the surface of the water by merely holding the cold water valve open until the level of the water in the reservoir is higher than that of the overflow plate.

A filter bed that divides the reservoir into two parts is used to remove the suspended impurities which are too heavy to float. The coke which is generally employed as the filtering material is supported by a removable perforated cast iron plate that prevents any material from getting into the lower or settling chamber. This chamber has two flat surfaces at the bottom which slope toward a common gutter at the center, and any minute particles passing through the filter naturally fall to the gutter and are removed by opening the blow-off that drains the gutter into the waste pipe. The removal of impurities by the sedimentation process is not hindered by a strong current in the settling chamber as the pump suction is located in a special outlet chamber in the upper portion of one side.

The body of the heater is made up of heavy ribbed plates bolted together and provided with special patented heavy steam and water-tight rust joints. The trays and their supports are constructed of substantial castings and are practically indestructible. Easy access to every part of the interior is afforded by manholes and handholes, while if necessary a man can easily get inside. The heating chamber door is hinged and fitted with slip bolts. Every part of the heater can be taken down with a monkey wrench, and as the parts are interchangeable they may be duplicated, and it is possible to extend the heater by the addition of more sections, as shown in Fig. 1. All the fittings are of copper and brass of the most approved design, and the flanges are companion flanges and are interchangeable and will fit the piping without the use of reducing bushings.

Public Works of Venezuela

We have received from Román Cárdenas, Caracas, a copy of the splendid memorial presented by the Minister of Public Works to the Legislative Chambers at the constitutional convention of 1911, to commemorate fittingly the celebration of the centennial of the independence of Venezuela. It comprises 300 pages, 9 x 12½ inches, and sets forth the natural resources of Venezuela and the progress that has been made in the last 100 years. Besides many interesting maps, the work contains numerous illustrations showing the national highways and railroads, notable public buildings, parks, forts, bridges and churches. A number of statistical tables are also given.

The Baldwin Strike.—The Baldwin Locomotive Works, Philadelphia, has made a statement through its attorney that the recent strike by a number of its employees is now practically a thing of the past. The plant has at no time been shut down, although operating with a restricted force. There has been a steady return of old employees in nearly all departments, and it is believed that in the near future a major portion of those who went out will again be at work. It is stated that the condition of the work at the Baldwin plant is such that the present interference is regarded as a benefit rather than otherwise, and will enable the company to provide a full week's employment hereafter to all those who may be so fortunate as to be reinstated in their old positions. Business conditions are unchanged, although the prospect is that a somewhat better volume of orders for locomotives will develop in the near future.

A French patent on jarring machines, covering the multiplicity of lifting cylinders to the jarring table, has been allowed the E. Killing's Molding Machine Works, Davenport, Iowa. Patents are pending in other foreign countries and arrangements are being made to establish in them agencies for the Killing molding machines. The jarring machine is operated by compressed air.

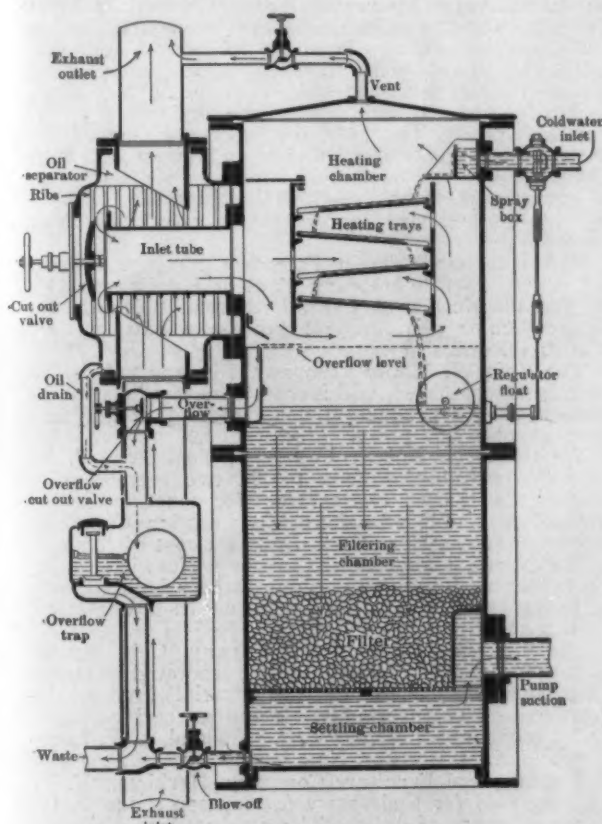


Fig. 3.—Diagrammatic Cross Section, Illustrating the Operating Principles of the Heater.

trays and the cold water flowing over these trays condenses the steam sufficiently to heat the feed water. The heating trays are loose and can be easily removed through the upper door when the coarser impurities deposited upon them make cleaning necessary. The air and the gases which are liberated from the steam as it condenses pass to the top of the heating chamber, where they escape through a vent into the exhaust outlet.

The water space in the Cookson heater is very large, and this assures a constant ample supply of hot water, which is allowed to lie quietly, an arrangement which facilitates the filtration and the sedimentation of the finer impurities that are deposited upon the lime pans. The cold water is admitted to supplement the condensation and to maintain a uniform level in the reservoir and its flow is controlled by a balanced valve actuated by a float. This float is a seamless copper sphere connected by levers to the stem of a perfectly balanced valve in the water inlet. The water is prevented from rising above a desired level automatically, and the reservoir surface is skimmed by an overflow plate which extends horizontally the depth of the heater and drains an even sheet of water into the overflow pipe. The difference between the normal and the overflow levels is suf-

The Machinery Markets

The American Steel & Wire Company has about finished placing orders against its \$100,000 list of needed machinery which came out in April, and the business was pretty well distributed throughout the country. Beyond this there is little of interest in the machinery situation. Business seems to be quiet in all directions. Chicago dealers are looking to the Santa Fe Railroad for some good orders, as that company has a list out calling for \$25,000 worth of machinery. The local demand in Cleveland has improved slightly. While actual business is light in Cincinnati a more cheerful feeling exists there. The automobile companies are busy in Detroit, and some trade is looked for in that direction. Some moderate-sized sales have been made in the electrical machinery and shoe machinery lines in St. Louis, but the general demand there is not large. Improved crop prospects are expected to bring out an increased call for pumping and ginning machinery in Texas, and the trade there is hopeful of a better business. In the South business is only fair, although inquiries are more numerous. The machinery trade in the East is very quiet. A new railroad list is expected in the New York market. Inquiries seem to develop slowly in Philadelphia, and there is sharp competition for trade.

New York

NEW YORK, June 28, 1911.

New business is very scarce in the machinery market, and orders are not coming in as fast as manufacturers and dealers had reason to expect, considering the inquiries made during the last few weeks. The American Steel & Wire Company placed some good orders with New York houses during the week for machinery which is to be distributed to its various plants. The New York Central Railroad has also been buying against a list recently sent out. It is understood that this company is preparing a large list of machinery, principally machine tools, which are to be delivered at the West Albany shops. R. T. Shea, who has offices at the Grand Central Station, has charge of making up the inquiries. The leading pneumatic drill manufacturer in this market has been buying for its Easton, Pa., plant and expects to come into the market for some equipment in the near future. The outlook in other directions is not very encouraging. Manufacturers of mill supplies complain that business has fallen off of late and there is a dearth of new enterprises. The lull is not sufficiently pronounced to make it appear that business during the next few weeks will not pick up, as there are enough inquiries out to warrant a better feeling, provided the parties making them show some inclination to close.

The T. A. Gillespie Company, 50 Church street, New York, will require a great deal of hydraulic machinery and tunneling equipment to carry out its contract for constructing a siphon under the Hudson River from Storm King Mountain to Break Neck Mountain at Cornwall, N. Y. The company has been awarded the work in connection with the Catskill aqueduct enterprise, and there is about 2700 ft. of tunneling to be done.

Westinghouse, Church, Kerr & Co., 10 Bridge street, New York, have been awarded a general contract by the Illinois Central Railroad that will call for heavy expenditures for mechanical equipment. The company has contracted to build at Champaign, Ill., a 25-track round-house in addition to a large machine shop and coal handling plant. The plans for the proposed buildings have not as yet been completed.

The city of Camden, N. J., will receive bids until July 10 on pumping machinery and other equipment for a plant to augment the city's facilities for fire protection. The equipment will include a large gasoline engine, a tank pump, an electrical generator and other power accessories. Specifications can be obtained from F. W. George, who can be addressed at the Court House, Camden.

The Crosswick Water Company, Crosswick, N. J., will shortly install a complete water works for municipal water supply purposes. Specifications for the equipment needed in the plant can be obtained at the office of the engineer, W. W. Young, 220 Broadway, New York.

The Bontempi Rust-Proofing Company, 111 Broadway, New York, has leased a plot of land 70 x 142 ft. in Bridgeport, Conn., on which the company will erect furnaces for commercial purposes. The contract for constructing the furnaces has been let to the W. S. Rockwell Company, 50 Church street, New York.

The Strong Steel Foundry Company, Buffalo, N. Y., now located at Main street and Fillmore avenue, has secured a site of 10 acres on the Erie Railroad at Hertel and Elmwood avenues with frontage of 1700 ft. Plans are being prepared for the building of a large plant with greatly increased facilities. O. H. P. Champlin is president of the company.

Commissioner of Public Works Francis G. Ward, Municipal Building, Buffalo, is receiving bids for furnishing and installing the power plant equipment for the J. N. Adam Memorial Hospital which is being erected by the city of Buffalo at Perrysburg, N. Y. The equipment will include three 80 hp. boilers complete, one 80 hp. engine with 50 kw generator, one 40 hp. engine with 25 kw generator; also for water supply system for fire and tank service one duplex pump, two deep well pumps, two pressure tanks and pumps, feed water heater and water purifier and pump and high pressure hot water heater; also bids for ice machinery for refrigerating plant, machinery equipment for laundry and switchboard equipment for electric lighting service.

The Huebner-Bleistein Patents Company, Buffalo, will add to its lithographing plant at Kensington avenue and the New York Central Railroad Belt Line for the new color photographic process a pattern shop 40 x 50 ft., one story.

The Ellis W. Moore Company, Binghamton, N. Y., recently incorporated, will increase the facilities for its business in the production and handling of mill and steam supplies and power transmission.

The Hodyran Rubber Company, Tuckahoe, N. Y., will erect an addition 80 x 100 ft. two stories to its plant at that place. The contract for construction has been let to the Northeastern Construction Company, 225 Fifth avenue, New York City; at a cost of \$30,000.

The Norwich Pharmacal Company, Norwich, N. Y., will build an addition to its main factory building now under construction, a power house 40 x 80-ft. one story, of brick and concrete construction.

The Cornell Construction Company, Cold Spring, Putnam County, N. Y., has been incorporated to manufacture machinery equipment and materials used in construction and engineering work and general contracting. The incorporators are C. P. Howland, L. V. Lockwood and N. B. Beecher, New York City.

The Standard Furniture Company, Herkimer, N. Y., is taking bids for a six-story factory 100 x 140 ft. for the manufacture of desks. The estimated cost of construction is \$75,000.

The Rudolph Wurlitzer Mfg. Company, North Tonawanda, N. Y., has let contract to the Durolithic Company, Buffalo, for construction of a three-story addition 140 x 310 ft. to be made to its plant for the manufacture of musical instruments. The improvement will cost \$150,000. Considerable equipment and machinery will be required.

The Rochester Watch Company, Rochester, N. Y., has been incorporated with a capital stock of \$500,000 and will establish a plant for the manufacture of watches. F. H. Corthell and T. C. Ward, Rochester, and E. R. Hills, Chicago, are the incorporators.

The Shepard Electric Crane & Hoist Company, Montour Falls, N. Y., is erecting an addition 78 x 125 ft. to its plant to provide increased machine shop and erecting space. Contracts for construction have been let, and arrangements have been made for such additional equipment as will be required.

The Mohawk Silk Fabric Company, Fultonville, N. Y., which is taking figures for erection of a new silk mill 54 x 201 ft., two stories, at Kingston, N. Y., as recently mentioned in *The Iron Age*, will build in connection therewith a power house 40 x 40 ft. C. R. Morley, Fultonville, N. Y., is manager of the company.

The Hotaling Warner Company, Syracuse, N. Y., has let contract for construction of its new factory 80 x 60 ft. and four stories and work has been commenced.

THE MACHINERY MARKETS

New England

BOSTON, MASS., June 27, 1911.

While dealers of the metal trades believe that the turning point of business has been reached they realize that no great amount of gain is to be expected during the hot weather. They believe that the next two months will be a period of readjustment to a new condition. A better sentiment is in evidence everywhere. The market has more life, or perhaps it would be better to say more signs of life. No important lists are out in the machinery trade, but the small inquiries amount collectively to a good fair business. To quote one experienced observer the early part of June was somewhat of a disappointment, for more of a gain had been expected than was experienced. But this dealer believes that on the whole conditions appear quite satisfactory and the summer months give promise of better results than were expected early in the year.

The tool steel people have had a dull month, but reports from large buyers in New England and the Middle West indicate that requirements will be much larger after the Fourth.

George Rowbottom, president of the Rowbottom Machine Company, Waterbury, Conn., has purchased of William W. Manville and Tracey F. Manville their interest in the Manville Bros. Company, of that City, and will be the manager of the business as well as the treasurer. The former owners withdraw completely from the industry. Mr. Rowbottom proposes to operate the business under the present name and in the same location, and in no way in connection with the Rowbottom Machine Company. His plan is to bring the shops up to the same degree of efficiency that prevails in those of the company which bears his name. The Manville Bros. Company builds automatic wire forming machinery, presses, etc., while the Rowbottom Machine Company's specialties include power and foot presses, chain machines, end and surface grinders and disc grinders.

The Norton Grinding Company, Worcester, Mass., gave a practical demonstration of a new car axle grinding machine at the works, last week, a representative body of railroad men being present. The machine grinds axles very quickly, using an exceptionally broad wheel face.

The Boston Chamber of Commerce will hold an industrial exposition in Mechanics' Building in October the purpose being to exploit New England industries, manufacturers outside of this district being excluded. Metal working machinery will be made an important feature.

The Parker Transmission & Appliance Company, Springfield, Mass., manufacturer of a variable speed transmission for machinery and vehicles, has increased its capital stock from \$250,000 to \$1,000,000, new interests having come into the business. The purpose is to create large shops, probably at Detroit, Mich., but not this season. Hunter Bros., Fulton, N. Y., are now actively interested in developing the industry. Charles W. Parker, the inventor of the mechanism, retains his holdings and will continue as head of the mechanical department. The present shops are in the Waltham Watch Tool Company's building, Springfield.

The New York, New Haven & Hartford Railroad states that the new machine shops which will be erected at Cedar Hill, New Haven, in connection with the new roundhouse will have sufficient capacity to care for ordinary running repairs of locomotives for this section of the system. This will mean undoubtedly a considerable amount of new machine tools and other equipment.

The improvements which the Lamb Knitting Machine Company, Chicopee Falls, Mass., is about carrying into effect include the addition of a fifth story to the main building, which will also be extended out to the street, the whole being five stories, including the basement. The changes will largely increase the company's capacity.

Walsh's Holyoke Steam Boiler Works, Holyoke, Mass., is erecting an addition to its works 40 x 80 ft., which will be used for the structural steel and iron work shop. The company states that the machinery for the initial equipment has been contracted for.

The Wright Wire Company, Worcester, Mass., is making improvements to its works at Palmer, Mass. A new building will be erected which will allow of the rearrangement of some of the machinery and also for the installation of equipment now located at Worcester. The result will be an increased capacity.

The Humason & Beckley Mfg. Company, New Britain, Conn., has sold its bright wire goods department and will go out of the manufacture of this line, which includes such articles as clothes line poles, screw hooks and eyes, blind fasteners, etc.

The Bridgeport & Danbury Electric Railway, which will connect these two Connecticut cities, will begin construction work immediately, the various difficulties in connection with rights of way having been adjusted.

The Austin Automobile Company, Grand Rapids, Mich., states that while it intends moving its works to some desirable Eastern point as soon as the arrangements can be made, the exact location has not been decided. The statement published in the daily press that South Norwalk, Conn., had been chosen is without foundation.

The Boston & Albany Railroad will erect a two-story steel and concrete building at Worcester, Mass., 125 x 180 ft., on a site of a part of the old Union station. The building will be occupied in part by shops and a steam heating plant for the new station.

The Sholes Typewriter Company will occupy part of the building at Waterbury, Conn., formerly occupied by the hardware department of the Blake & Johnson Company.

Additions to general manufacturing plants include a three-story building 30 x 90 ft. for the Vanderhoef Mfg. Company, South Norwalk, Conn.; a four-story mill 135 x 268 ft. for the Hamilton Mfg. Company, Lowell, Mass., textiles; dye house 46 x 277 ft. for the Bigelow Carpet Company, Lowell, Mass., and a dye house 40 x 70 ft. for J. D. Clark & Co., Greenville, Mass.

Philadelphia

PHILADELPHIA, PA., June 26, 1911.

There is still an absence of any buying in quantity, both merchants and manufacturers reporting about an even volume of small orders, which continue to come out in a regular manner. Railroad buying is still of a negligent character, inquiries in this district being few and far apart, and such as have recently developed close very slowly. Manufacturers continue to operate on an irregular basis, and a number of plants will make a three-day suspension over the national holiday. Inquiries for the usual standard types of machine tools come out slowly and are usually confined to single tools. For special equipment the demand has been somewhat better, but far below normal, and sharp competition prevails in practically every case. Better trade conditions reported in some of the other buying districts has not yet had any material influence on conditions in this territory.

The second-hand machinery market shows but little movement, reflecting conditions in the general trade. There is still a fair amount of business under negotiation in power equipment. While engine builders are not very actively engaged, a fair demand for engines of moderate size is noted. The demand for boilers has been comparatively good, and makers have been quite actively engaged. Irregularity is still to be noted in the demand for both steel and iron castings, and plant operations are uneven and generally represent from 50 to 75 per cent. of capacity.

Plans adopted by the management of the Philadelphia Rapid Transit Company, announcement of which was made last week, include the purchase of 30 new steel cars for the Market Street Elevated system. Several extensions to its service are also provided for, involving an expenditure of \$229,000.

The Philadelphia Roll & Machine Company reports a moderate increase in the volume of business coming in. Comparatively good orders have recently been received for both sand cast and chilled charcoal iron rolls as well as for general castings. It is also building a considerable quantity of machinery which is of a special type.

The Pennsylvania Equipment Company, West End Trust Building, is in the market for a new or second-hand vertical or horizontal type gas engine of 250 to 350 hp. capacity; also for 100 to 200 sets of freight car couplers, preferring the Janney.

The Hess Machine Works reports a slightly better demand for special machinery. Orders have been received for one set of file making machines for export to France and several sets for domestic customers. Orders for small machine specialties have been in better volume.

W. W. Lindsay & Co. have contract to construct a

THE MACHINERY MARKETS

steel and concrete power house 115 x 115 ft. for the Charleston Consolidated Railway & Lighting Company, Charleston, S. C. This company is a subsidiary of the United Gas Improvement Company of this city, which concern, it is stated, will place orders for the equipment required.

Under the recent municipal loan, authorized at a special election, Mayor John H. Reyburn has signed the necessary ordinance making \$9,750,000 available for city improvements out of a total loan of \$11,500,000, the remainder being apportioned for the Board of Education. Among other items this ordinance apportions \$500,000 for the extension of the high-pressure fire main service, \$600,000 for harbor improvements, \$1,500,000 for a convention hall, \$200,000 for new bridges \$100,000 for elevators in the City Hall and \$250,000 for sewer work.

Cincinnati

CINCINNATI, OHIO, June 27, 1911.

There is undoubtedly a more cheerful feeling among local machine tool builders, although actual business being booked does not justify any great change in sentiment just now. Inquiries are more plentiful, and the Atlantic City convention of railroad master mechanics has stimulated interest in the railroad situation. One central Western system has recently purchased a number of locomotives and is also reported to have purchased about 1000 freight cars. Other larger Western roads are also said to be feeling around for additional equipment.

New factory building operations in this vicinity are not up to standard, but so many additions to existing plants have been completed during the past eight months that it may be some time before there is another building boom in manufacturing structures.

The regular quarterly report ending June 15 of the Cincinnati Branch, National Metal Trades Association, has just been issued by Secretary Manley, and it shows a falling off in manufacturing activities of about four per cent. as compared with the quarter ending March 15 of this year. Taking the three months ending June 15, 1907, as standard, the report referred to shows 87 per cent. of activity. Last year's record for the similar period indicated 92 per cent., and the poorest showing was made during the three months ending June 15, 1908, when local plants were only operating to about 56 per cent. of capacity.

Headed by E. M. Chace, superintendent of the Cincinnati Milling Machine Company, a delegation of local superintendents and foremen visited the Cincinnati Continuation School June 22. Mr. Chace gave the students a talk on the manufacture, use, etc., of screws. A different number of superintendents propose to visit the school once each week, short addresses on live shop topics being made the class by the visitors.

To manufacture gasoline engines the Arthur Machine Company has been incorporated at Richwood, Ohio, with \$20,000 capital stock. The incorporators are George Y. Arthur, C. E. Zieg, E. J. Tobey, H. J. Brooks and M. W. Arthur.

The Columbus Auto Top Company, Columbus, Ohio, has been incorporated with \$10,000 capital stock to manufacture tops and other accessories for automobiles. Nelson Roller, John Oswald, L. D. Davis, Fred Oswald and E. M. Fickel are the incorporators.

The Cincinnati Milling Machine Company is taking preliminary steps for abandoning its Spring Grove avenue plant. The large addition to its Oakley plant is nearing completion, but it will probably be October 1 before the move is completed and the new factory in full operation.

A party of Cincinnati stockholders of the American Rolling Mill Company left on a special train June 27 to inspect the company's new mill at Middletown, Ohio. The plant is nearly completed and represents an outlay of over \$2,000,000.

The Columbus Carriage Works, Columbus, Ohio, has acquired the old plant of the Melbourne Buggy Company in Newport, Ky., to which some repairs and additions will be made at an early date.

The Heilman Motor Car Company, Cincinnati, has taken out a permit to erect a two-story public garage to cost about \$9000.

The Superior Mfg. & Mill Supply Company has been incorporated at Springfield, Ohio, with \$50,000 capital stock to manufacture and sell gas and gasoline engines and a general line of machinery. No manufacturing plans have been given out. The incorporators are George C. Lynch, John W. Burk and others.

A superintendents' and foremen's club was organized at Oakley on the evening of June 22. It is intended to take in as active members only the superintendents and foremen of the shops in Oakley suburb. About 60 attended the initial meeting, which was addressed by J. M. Manley, secretary of the local branch, National Metal Trades Association. Officers will be elected and permanent quarters secured at the next meeting, which is scheduled to take place one evening next week. Educational as well as social features will characterize the different meetings.

The foundations for the new plant of the Alvey-Ferguson Company at Oakley have been completed and work is progressing rapidly on the buildings. The company's present intention is to move from its old quarters at Louisville before the winter season sets in.

The Union Gas & Electric Company, Cincinnati, has acquired a site at St. Clair and Gano alleys, where the large electric station recently mentioned will be erected.

Cleveland

CLEVELAND, OHIO, June 27, 1911.

The local demand for machine tools shows a little improvement and the outlook is regarded better than for some time. While no inquiries of any size are coming out dealers are doing a fair volume of single tool business. The placing of some orders, which have been pending for some time, are still being held up, but it is believed that with a little additional change for the better in general conditions much of this business will be placed without further delay. In many manufacturing lines the general feeling is better, and some plants report an improvement in orders. In the automobile trade the outlook is generally regarded as satisfactory, and some of the manufacturers are already planning for a large output of 1912 cars, showing more confidence in the future than they did last year in planning for this season's output. A large amount of work is going on or in prospect in building lines in this territory, and this is causing a good demand for various products used in construction work. There is a fair demand for pipe threading machinery, some makers getting a better volume of orders than at this time a year ago. The demand for blowers is very active, being largely at present for equipment for ventilating purposes. The demand for ceilings and other sheet metal products has improved.

The Superior Metal Products Company, Elyria, Ohio, has been incorporated with a capital stock of \$15,000 by H. E. Hall, L. H. Lang, L. J. Zeager, M. C. Powers and U. J. Smith. The company will make metal stampings and do brass and nickel plating and general machine work.

The Universal Machine Company, Toledo, Ohio, which recently took over the plant of the Standard Machine Company, Bowling Green, Ohio, has commenced the erection of extensions to the plant, consisting of four one-story brick buildings. These will be a machine shop, 60 x 120 ft.; a foundry, 55 x 100 ft.; a pattern shop, 30 x 40 ft., and a blacksmith shop, 25 x 40 feet. The company will move its plant from Toledo to Bowling Green about October 1. At present bolt cutters are being made at the Bowling Green plant and cement machinery and marine motors at the Toledo plant.

The Toledo-Flanner Boiler Company, Toledo, Ohio, manufacturer of water tube boilers, is having plans prepared for an addition to its plant at Cleveland and Factory streets, which will about double its size. The new building will be about 150 x 100 ft.

The Acklin Stamping Company, recently organized in Toledo, Ohio, has completed an up-to-date plant on Dorr street, which was placed in operation during the past week. The company starts out with a good volume of orders. It will make stampings in steel, brass, aluminum and other metals. James M. Acklin is manager and W. C. Acklin secretary and treasurer.

The A. T. Nye & Son Company, Marietta, Ohio, is having plans prepared for a large addition to its molding room. The company has placed orders for several molding machines, and when the extension to its plant is completed its output will be doubled.

The Banner Electric Company, Youngstown, Ohio, has completed plans for a new factory building on Williams street in that city. It will be 150 x 200 ft., with three stories and a basement.

J. F. Lanfersieck & Co., New Bremen, Ohio, have let the contract for the erection of a new plow factory. It will be 70 x 100 ft.

THE MACHINERY MARKETS

A new factory will be established in Sugar Creek, Ohio, for the manufacture of furnace registers.

The Fremont Stove Works, Fremont, Ohio, will build an addition to its plant.

Chicago

CHICAGO, ILL., June 27, 1911.

A continuance of activity in the buying of machine tools supported by a better than average demand for second-hand equipment contributed to a very satisfactory run of business in the machinery trade last week. The American Steel & Wire Company has placed the orders for its large list of machinery, but local dealers did not fare as well in the distribution as had been hoped. It is expected that the placing of \$25,000 of tools by the Santa Fe road this week will be very largely in this market. It developed during the week that British machine tool dealers can buy second-hand tools in the United States to better advantage than they can at home. What is perhaps more surprising, as developed by an inquiry for several thousand dollars of second-hand machine tools, is the statement that prices quoted in this market for tools f.o.b. New York and boxed for export were more favorable than those obtained in the East.

The Mechanical Machine & Tool Works, Chicago, has been incorporated with \$6000 capital stock. The company's business will have to do with machinery, tools, patterns, etc. The directors are Henry S. Jewell, F. L. Rissling and Fred C. Jewell.

The Macomber & Whyte Rope Company, Chicago, has concluded negotiations whereby a site of 11 acres has been secured at Kenosha, Wis. A plant will be built there to include a wire mill 100 x 300 ft., a rope shop and warehouse 140 x 440 ft., a reel shop 40 x 60 ft. and other necessary buildings.

The Western Steel Foundries Company, Denver, Colo., with offices in the First National Bank Building, that city, has just been incorporated with a capital stock of \$400,000. The company has bought the plant of the Colorado Gray Iron Foundry Company.

The Oklahoma Iron Works, Tulsa, Okla., is building new foundry and blacksmith shops, the new building to be 80 x 140 ft. New equipment is to be purchased.

The Roush-White Co., Stuttgart, Ark., is equipping a general repair shop and foundry having a capacity of about eight tons a day. The company will specialize on deep water pumps, feed mills and cast iron sewer pipe, employing about 30 men.

The Sturdy-Racine Mfg. Company, Racine, Wis., is preparing to manufacture farm gas motors and pumping engines. Equipment is being obtained for the company by F. B. Swingle.

Detroit

DETROIT, MICH., June 26, 1911.

Optimism is generally prevalent in the machinery situation locally this week, and conditions throughout the state continue to be quite active. The recent reduction in steel prices is seemingly proving beneficial and is bringing out a fair demand for machinery in some lines. The automobile companies generally are running to their full capacity, but are finding no difficulty in employing skilled labor owing to the unsettled conditions in some of the Eastern labor centers. The accessory supply concerns are, of course, benefitting somewhat through the letting of sub-contracts for supplementary parts. Inquiries for machine tools, however, seem to be rather scarce, no lists of any considerable size coming out.

The semiannual convention of the National Gas and Gasoline Engine Trades Association was held here June 20 to 23, about 200 delegates and exhibitors being registered. The exhibition was, of course, necessarily confined to accessories, but the various magnetos, batteries, oiling devices, etc., created a great deal of interest. Orders aggregating a large amount were placed with local firms by some of the visitors.

A deal of considerable importance that has been pending for some time was brought to a head this week by the purchase by the Quinn Mfg. Company, Kalamazoo, of a site for a new factory here. Plans are now in the hands of the architects for a five-story factory building 100 x 158 ft. The company employs a large force of men and manufactures plumbers' brass work, steam, plumbing and well supplies. A good deal of

equipment, including elevators, etc., will be required. The company has also increased its capital stock from \$150,000 to \$225,000.

The Michigan Auto Trimming Company, of which B. F. Clines is president, has filed a petition in bankruptcy.

Another automobile company has been organized here to be known as the Chief Automobile Company. The concern has a capital stock of \$200,000, with Thomas J. Atkinson and John G. Schultz as the principal stockholders.

An important organization has been incorporated this week with the title of the Commercial Body Company. The company has a capital stock of \$300,000, Stewart Seymour, Richard R. Wade and John E. Chapman being the chief stockholders.

The Dreskell Paper Company of this city has changed its name to the Bingham-Seaman-Patrick Company and increased its capital stock from \$25,000 to \$65,000.

The Michigan Steel Castings Company has let the general contract for a two-story addition to its factory building to Conrad Keller & Co. Considerable new equipment will be installed.

Jackson & Maurice has secured the general contract for the construction of a large addition to one of the buildings of the Packard Automobile Company's plant.

The Renfro Speedometer Company has increased its capital stock from \$50,000 to \$75,000. The company has enjoyed an excellent business and the increase is to take care of future requirements.

The Detroit Machinery Supply Company has been organized with a capital stock of \$8,000 and will do a general machine shop business.

Louis F. Raye, president of the International Sand, Lime, Brick & Machinery Company, who is now in Battle Creek, has announced that he has decided to locate a large new factory branch of his company in that city. The plant will make a specialty of silica brick.

The village of Baraga, Mich., is contemplating the installation of an electric light and water works system at an expense of approximately \$35,000. The proposition is to be submitted to the citizens shortly.

The light and power commission of Marquette, Mich., is figuring on the purchase of a large generator and water wheel for the municipal power plant in order to have a complete auxiliary unit of machinery in case accident should befall the present equipment.

The Grand Rapids Cigar Box Company, Grand Rapids, Mich., has increased its capital stock from \$20,000 to \$30,000.

The Cartercar Company, Pontiac, Mich., is to erect a new machine shop. The building will be of brick, 70 x 144 ft. one story and of saw-tooth roof design. Considerable equipment will be installed.

The Monroe Mfg. Company, Pontiac, Mich., makers of automobile accessories, is erecting a large building and will equip it for the use of the company's sheet metal stamping department.

A new company is being organized at Cadillac, Mich., for the manufacture of a folding crate invented by H. H. Cummer of that city.

Allegan, Otsego and Plainwell, Mich., have approved the application of C. A. Runyon, of South Haven, for franchises for gas plants. It is the purpose of the syndicate represented by Mr. Runyon to build a central plant to supply all three villages.

The Gloss-Dura Paint Company is the newest industry of Big Rapids, Mich. The company will produce a new paint patented by H. C. Pritchard of that city.

Announcement is made that the Standard Oil Company has secured an option on a large tract in Muskegon, Mich., and will in all probability erect a distributing station thereon. If the option is exercised it will mean the expenditure of from \$65,000 to \$75,000 for the erection of tanks, buildings and general equipment.

Negotiations were closed this week for the location in Saginaw, Mich., of the Wolverine Optical Company, a \$50,000 concern of which M. W. Wentworth and W. C. Kellogg are president and secretary respectively. The company will manufacture opticians' and physicians' supplies and will commence business as soon as the equipment can be installed.

The Connor Foundry Company, Grand Rapids, Mich., has filed articles of incorporation with the Secretary of State. The company has a capital stock of \$15,000.

The Port Huron Paper Company, Port Huron, Mich., has organized with a capital stock of \$20,000 and

THE MACHINERY MARKETS

will commence a general paper manufacturing business in the near future.

The St. Helen Preserving & Canning Company has been organized at St. Helen, Mich., to do a general canning business. The new company expects to be in shape to handle the present fruit crop.

The William Horner Flooring Company's plant at Reed City, Mich., was badly damaged by a fire which destroyed the dry kiln. The burned portion of the plant will be immediately replaced.

The firms of Longyear & Hodge, Marquette, Mich., and E. J. Longyear, Hibbing, Minn., have consolidated under the title of the E. J. Longyear Company with manufacturing headquarters at Marquette. The company is a large producer of diamond drills and drill supplies.

A new industry has been incorporated at Lansing, Mich., under the name of the Whitaker Switch Throw Company. The new company, which is to manufacture a patent switch device, has a capital stock of \$75,000, with D. K. Creighton, president, and N. H. Whitaker, superintendent. Actual manufacture will start as soon as possible.

The Good Roads Commission of Jackson County is considering the purchase of a high powered traction engine and six steel cars for use in road building. Commissioner Bryant, of Jackson, Mich., has the matter in charge.

The plant of the DeVilbiss Plier Works at Dundee, Mich., was badly wrecked by a cyclone and will have to be practically rebuilt before work can be resumed.

The citizens of Owosso, Mich., have voted to bond for \$5,000 for the purpose of establishing a branch fire department at West Owosso. New equipment will be ordered as soon as possible. The city is also planning the purchase of a stone crushing machine.

The Island City Pickling Company, Eaton Rapids, Mich., is making extensive improvements to its plant, including an entire new steam heating system.

Indianapolis

INDIANAPOLIS, IND., June 27, 1911.

The Cole Motor Car Company, Indianapolis, is having plans prepared for a new factory to be erected in the near future. The equipment of this company's present plant will then be materially increased.

The Navin-Baker Safe Company, Indianapolis, has been incorporated with \$10,000 capital stock, to manufacture and deal in safes and office furniture. The directors are A. J. Navin, George A. Baker and E. W. Little.

The Roberts Mfg. Company, Indianapolis, manufacturer of carbureters, has increased its capital stock from \$10,000 to \$50,000. W. H. Roberts is secretary-treasurer.

The Oakes-Enders Company, Indianapolis, has been incorporated with \$10,000 capital stock, to manufacture automobile parts. The directors are H. J. Enders, E. C. Enders and W. H. Oakes.

The Indianapolis Gas Engine Company, Indianapolis, has been incorporated, with \$10,000 capital stock, to manufacture gas engines. The directors are Thomas Strack, W. P. Best, H. A. Noffke, Ray Carmichael and B. N. Lay.

The Greene County Collieries Company, Midland, Ind., has been incorporated, with \$50,000 capital stock, to operate coal mines. The directors are W. L. McVicker, M. E. Magg and G. B. Owen.

The American Roller Screen and Stamping Company, of Chicago, has purchased the abandoned buildings of a stove company at Greenfield, Ind., and will move its plant there.

The Teegarden Brick & Tile Company, South Bend, Ind., has been incorporated, with \$20,000 capital stock, to manufacture brick and tile. The directors are Wm. B. Calvert, D. G. Miller and William Miller.

The Gary Chamber of Commerce, Gary, Ind., has been organized to push the growth of the city. Judge Louis T. Bryan is president of the organization.

The Tell City Furniture Company, Tell City, Ind., is building an addition to its plant to cost \$20,000, and which will increase the capacity one-fourth.

The Citizens Factory Committee of Anderson, Ind., has agreed to pay \$15,000 of the \$17,000 cash bonds yet due the Jenny Electric Company, so that a new company may be organized, take over its obligations and remove it from the receivership, to enlarge the capital stock, add to its products and subsequently increase the capacity of the plant. Samuel Murray, of Cincinnati, has a controlling interest in the stock and

is represented at Anderson in the management of the plant by Vivian J. Fagin.

W. H. Isley has been appointed receiver of the Shelbyville Foundry & Machine Works, Shelbyville, Ind., for the purpose of reorganization. The plant manufactures gasoline engines and will be continued in operation.

The Stanley Differential Hub Company, Logansport, Ind., has been incorporated with \$60,000 capital stock, to manufacture Stanley differential auto hubs. The directors are George W. Stanley, E. D. Morgan and Z. Taylor.

The Lafayette Safe & Lock Company, Lafayette, Ind., has been incorporated, with \$25,000 capital stock, to deal in safes, locks and other iron and steel merchandise. The directors are George Jenks, F. Dryfus and John J. Schultz.

The South

LOUISVILLE, KY., June 27, 1911.

Though the volume of business continues to be only fair, the feeling in the local market is better and manufacturers report that the number of inquiries being received is considerably larger than has been the case for some time heretofore. A well-known machinery man declared that business is now down on a rock-bottom basis, and that the orders which are being placed are coming because they have to. The speculative element has been entirely eliminated, he added.

Dealers in machine tools are receiving some inquiries from the Universal Stenotype Company, which recently took over a plant at Owensboro, Ky. The indications are that the concern will buy a fair list of equipment.

The installation of the new automatic fire-alarm system of the city of Louisville has begun and the work will require several months. The equipment, which includes a switchboard and other central office apparatus, is to be installed principally by the James Clark, Jr., Electrical Company, Louisville, and the Star Electric Company, Binghamton, N. Y.

R. H. Courtney, Louisville, trustee in bankruptcy, will sell the machinery and equipment of the Tennessee River Hardwood Lumber Company at Brickport, Ill., July 10. Power and woodworking machinery are included.

The Barrett Mfg. Company is doubling the capacity of its Louisville plant, and is installing stills, condensers, boilers, etc. Most of the equipment was moved from the Dayton plant of the company. The installation is being done by the American Boiler Works, Louisville.

The Tycrete-Concrete Company, Louisville, which is erecting a factory building at Thirteenth and Oak streets, has let contracts for the equipment to the Ideal Concrete Machinery Company, of South Bend, Ind. The outfit consists of mixers, block machines, etc.

The Falls City Construction Company, Louisville, which has the general contract for the erection of a 10-story office building at Center and Jefferson streets in this city, has let a contract for the structural iron work to the Louisville Bridge & Iron Company. The contract is on a tonnage basis, revised estimates showing that close to 500 tons will be required. The building will probably have its own refrigerating and power plants.

The Louisville Lighting Company is adding a good deal of new equipment at its power plant. The General Electric Company is installing a 7500-kw. horizontal turbine, the largest of this type which the company has constructed, while contracts have been let to the Babcock & Wilcox Company for two boilers, each having a capacity of 600 hp. The work will be completed during July. Wilbur Hubley is chief engineer of the Louisville Lighting Company.

The McCowen-Probst-Menau Company, which, as reported in last week's issue of *The Iron Age*, has begun operations at Salem, Ind., was incorporated some time ago with \$40,000 capital stock. It will make bathtubs and enameled plumbers' supplies. Considerable extensions of the plant will be made during the summer. It has two buildings, one 75 x 200 ft. and the other 75 x 150 ft. William G. Probst, former superintendent of the local plant of the Standard Sanitary Mfg. Company, is superintendent of the Salem plant.

The Henry Vogt Machine Company, Louisville, has been awarded the contract for two 250-hp. water-tube boilers and smoke stack for installation in the power plant of the Fayetteville Electric Light & Power Company, Fayetteville, Ark. The Dixie Cotton

THE MACHINERY MARKETS

Oil Company, of Little Rock, Ark., has contracted with the Henry Vogt Company for two 150-hp. high pressure return tubular boilers and accessories.

The property of the Acme Mills & Elevator Company, of Hopkinsville, Ky., will be sold at auction July 2. The plant is divided into two parts, each of which has its own power plant. The property is valued at \$200,000.

It is reported that a button factory is to be established at Dover, Ky. The factory will utilize mussel shells which are found in the Ohio River at that point.

The Automobile Club Garage Company, Lexington, Ky., is erecting a garage and repair shop. An elevator will be installed, as well as tools for the shop. Address Charles Berryman.

The new power station of the Kentucky Traction & Terminal Station Company, at Lexington, Ky., will have a capacity of 4750 kw., it is announced. The expenditures of the company in connection with the station and other improvements will aggregate \$800,000.

The Lunda Light Company has been incorporated at Memphis, Tenn., with a capital stock of \$50,000. The incorporators are P. F. Lunda, N. W. Lunda, W. L. Fisher and others.

The Durham Coal & Iron Company, Chattanooga, Tenn., has purchased additional iron ore lands near Chattanooga. It is stated that they will be developed in the near future.

The Severance Mfg. Company, 302 Church street, Nashville, Tenn., which was recently incorporated for the purpose of manufacturing gas machines, wire hammers, etc., is completing the equipment of its factory, the contracts for the machinery having been let to the A. E. Kinsey Company, Cincinnati. It is stated that the company is contemplating the establishment of branch factories in other cities.

The Hurst Trust Company, Memphis, Tenn., is in the market for an electric elevator to be used for factory purposes.

The John G. Duncan Company, Knoxville, Tenn., is asking for prices on a 150-hp. second-hand tubular boiler.

The Rose Spring Bed Company has been organized at Memphis, Tenn., for the manufacture of spring beds. A building is being erected, and operations will be begun in a few months.

Quarrying and finishing equipment will be required by the Crystal Onyx Company, Knoxville, Tenn., which is planning to open onyx quarries in Eastern Tennessee. B. W. Dorrance, Candler Building, Atlanta, is one of the officers of the company.

A. E. Payne, of Washington College, Tenn., is organizing a company for the purpose of developing slate and cement rock deposits in that section.

F. L. Sates & Co., Nashville, Tenn., have filed articles of incorporation with \$9,000 capital stock. The company will deal in machinery.

The Meadow Marble Company, Meadow, Tenn., has announced plans for opening two additional marble quarries. The Cumberland Marble Mill Company, of Meadow, is also planning to increase its output of marble.

Tracy W. Pratt, Huntsville, Ala., is interested in a project to establish a paper mill in that city, and is quoted as saying that the enterprise is a certainty. It is to represent an investment of \$100,000 and will consume tupelo gum.

The Farmers' Cotton Oil Company, Huntsville, Ala., has decided to increase its capital stock to \$500,000 and to make a number of improvements. A fertilizer and acidating plant will be installed. The improvements are to be made this summer.

The planing mill of the Henderson Lumber Company, at Sanford, Ala., which was recently burned, is to be rebuilt.

A band-mill is to be erected by the Ward Lumber Company, Chicago, near Sunflower, Miss.

The Southern Home Laundry Mfg. Company has been organized at Anniston, Ala., for the purpose of making domestic laundry equipment.

The shops of the Gulf & Ship Island Railroad Company at Hattiesburg, Miss., are to be rebuilt. W. H. Gardner, Jr., of Gulfport, Miss., is chief engineer.

The plant of the McArdle Foundry & Machine Works, Clio and Erato streets, New Orleans, La., is to be sold at auction. The company manufactured power transmission machinery, and the plant is valued at \$65,000.

A water-works plant to cost \$60,000 is to be established at Morgan City, La. Xavier A. Kramer, Magnolia, Miss., is drawing plans.

The Georgia Marble Finishing Works, Canton, Ga., will rebuild its plant, which was recently burned. Plans provide for the installation of an 18-gang mill, six rubbing beds, diamond saw, lathes, polishing machines, 400-hp. plant, etc. The company expects to resume operations in October.

Power sites in North Georgia are to be developed by the Appalachian Power Company, Toccoa, Ga., which has been incorporated with \$250,000 capital stock by Louis B. Magid, William Hillyer and D. S. Wommack. Mr. Magid is president of the Atlanta Hydro-Electric Power Company.

The McCreary Lumber Company has purchased a sawmill at Franklinton, La., and will remodel and improve it, installing planing mill equipment and making other extensions.

The Bay Springs Electric Company has been incorporated at Bay Springs, Miss., with \$10,000 capital stock, by C. E. Burnham, L. L. Denson and others.

Samuel Worcester and others are planning the erection of a gas plant costing \$25,000, at Birmingham, Ala.

A company is being promoted at Birmingham, Ala., for the establishment of a chain works. M. P. Messer, of the Industrial Bureau, has the details.

St. Louis

St. Louis, Mo., June 24, 1911.

The machine tool market continues to show promise of a better future, due to increasing inquiries and increasing personal investigations. There have been some moderate-sized orders placed during the week and several branches of the metal-working industry, locally, are quite busy, notably the three large plants manufacturing electrical machinery and the local manufacturers of shoe machinery. The woodworking plants whose destruction by fire was noted last week are getting their affairs adjusted with the insurance companies and are likely any day now to begin making specifications for machinery for immediate delivery to temporary plants and future delivery to permanent plants to replace the destroyed establishments.

One of the interesting developments of the fire has been increased inquiry directed to the Webb Motor Fire Apparatus Company and the Robinson Fire Apparatus Company, both of which manufacture self-propelled fire apparatus which was given practical tests in getting to the blaze. The running time developments and the ability to stand up under severe work resulted in interested inquiry from a number of directions.

The Fred Medart Mfg. Company, which makes a specialty of gymnasium and playground apparatus, is extending its plant and has installed a number of new machine tools.

The Missouri Bridge & Iron Company has been making some extensions to its structural steel shop in East St. Louis, involving the purchase of cranes, etc.

The Aluminum Company of America is extending its large plant in East St. Louis, embracing both new construction and new equipment.

The St. Louis Car Company reports increasing business and the utilization of a greater proportion of its plant, which in extent and equipment is one of the largest in the country. Its new orders include a number of elaborate parlor cars for the Illinois Traction System for especially fast limited service.

Texas

AUSTIN, TEXAS, June 19, 1911.

The breaking of the drought in a portion of the cotton and corn belt of the State has caused an improvement in business conditions and an increase in the demand for machinery of various kinds is expected to take place. In south Texas, where irrigation is depended upon largely by the farmers in the growing of their crops, harvesting has been in progress for some time and attention is now being given to the installation of new pumping plants and repairing of existing plants preparatory to the coming season.

Conditions in Mexico show a slight improvement, but there seems to be very little doing in that country in the way of inaugurating new industrial enterprises.

The contract for the installation of a garbage crematory at Temple has been awarded by the City Council to R. H. Wynne & Co.

The City Council of Huntsville will soon take steps toward enlarging the water-works pumping plant and to increase the water supply of the town. Another

THE MACHINERY MARKETS

Eastern Canada

TORONTO, ONT., June 24, 1911.

artesian well will be put down and the capacity of the pumping plant doubled.

The City Commission of Austin has under consideration the matter of installing a municipal abattoir and accessory plants.

The installation of a municipal abattoir at Beaumont is under consideration by the City Council. The proposed plant will cost about \$25,000.

The Liberty Light & Power Company, which is now installing an electric light plant and a 5-ton ice plant at Liberty, will also erect a creamery. R. E. Bowen is president of the company.

The Glass Mountain Canning Works has been organized at Marathon, for the purpose of installing a canning factory. Isaac Roark is at the head of the project.

The Capital City Auto Company, Austin, will install a large automobile repair shop and machine works.

J. A. Sober, Sunbury, Pa., contemplates installing a peanut butter factory at Austin.

The Medina Irrigation Company has been formed with headquarters at San Antonio for the purpose of constructing a large system of irrigation in the valley of the Medina River. The company's capital stock is \$1,000,000. The incorporators are T. B. Palfrey, Charles C. Cresson and Frank Gross, all of San Antonio. The Pacific Securities Company, Ltd., Toronto, Canada, which is headed by Dr. F. S. Pearson, of New York, owns a majority of the stock of the company. It is stated that more than \$6,000,000 will be expended in the enterprise and that about 70,000 acres of land will be brought under irrigation.

Winfield Scott and associates will install a large cotton gin at Cleburne.

The City Council has taken steps for increasing the water supply of the municipal water works plant of Terrell.

The Melissa Waterworks Company has been formed for the purpose of establishing a water-works plant and distributing system at Melissa. Dr. W. S. Wysong is at the head of the project. Wells will be sunk, a pumping plant built and a system of mains laid throughout the town.

The Arno Co-operative Irrigation Company is making extensive improvements to its irrigation system near Arno. It will irrigate about 15,000 acres of land.

The Land & Milling Company, Marshall, Mo., has begun the erection of its large milling plant at Texarkana, Texas. It will be equipped with modern machinery.

The Mission Canning Company will enlarge the capacity of its canning plant at Mission. It now has a daily capacity of 40,000 cans.

The Boston-Texas Corporation, which is developing an extensive oil field near Crowther, has under consideration the erection of an oil refinery. S. A. Hopkins, of Boston, Mass., is at the head of the project.

The Santa Fe Slaton Development Company has been organized at Slaton, with a capital stock of \$16,000. The incorporators are P. E. Jordan, Cash Remy and I. Foster Scott, Jr.

The Teich Monument Company has been formed for the purpose of operating a stone-cutting plant and monument works at Llano. It has a capital stock of \$75,000. The incorporators are Frank Teich, Alfred J. Ridder and George Bodet.

The County Commissioners' Court at Silver City, N. M., has under consideration the construction of a number of bridges in different parts of the county. The El Paso Bridge Company, El Paso, was recently awarded the contract for constructing a bridge across Cameron Creek at Central. It is probable that the contract will soon be let for constructing a bridge across the Gila River near old Fort West.

The City Councils of New Braunfels has called an election of taxpayers for July 11 to vote on the proposition of issuing \$67,000 of bonds for the construction of a dam across the Guadalupe River and the laying of water mains from the reservoir to the Comal Springs, where a pumping station will be installed for furnishing the city with water.

The Westinghouse Machine Company is investigating the situation at Austin with the view of installing a plant here for manufacturing electrical equipment.

The Amarillo Planing Mill Company, Amarillo, has been formed with a capital stock of \$12,000. The incorporators are H. E. Hume, J. D. Anderson, and W. P. Cooper.

The Fort Worth Elevator Company, which recently increased its capital stock of \$100,000 to \$150,000, will make improvements to its plant at Fort Worth.

Trade in machinery and equipment continues in the same state of satisfactory activity that has been the rule for several weeks. All the conditions are encouraging for a steady improvement, the crop outlook growing brighter as the time of harvest is approached. This is usually a critical month for the Northwest crop. Reports of its progress are quite assuring.

Letters patent have been granted by the Dominion government for the incorporation of the Grand Metis Power Company with a capital stock of \$100,000, the chief place of business to be at Montreal.

The Wagner Electric Mfg. Company of Canada has been incorporated under Dominion laws with a capital stock of \$50,000, the chief place of business to be at Montreal.

The International Construction Company has been incorporated under Dominion laws with a capital stock of \$1,000,000, the principal place of business to be at Montreal.

Letters of incorporation have been granted to the Banner Incandescent Lamp Company with a capital stock of \$500,000, Toronto to be the principal place of business.

The Joseph Roger Dusablon Company, St. Sasamir, Que., with a capital stock of \$20,000 has been incorporated under Dominion laws. Iron smelting, brass and steel foundry work and electro plating are some of the industrial operations authorized.

B. Frier, Ltd., has been incorporated under Dominion laws with a capital stock of \$1,000,000, the principal place of business to be at Montreal. Its commercial and industrial powers are very wide.

An order has been given by the Grand Trunk Pacific Railway to the Montreal Locomotive Works, Montreal, for 45 locomotives, to be delivered between July and October.

The residents of the district between Hamilton and Beamsville, Ont., have started a movement to obtain a distribution of power from the line of the Hydro-Electric Commission. It is expected that for this purpose a substation of the system will be built at St. Anns.

W. H. Weller, St. Catharines, Ont., has the contract for a portion of the increased water works plant in Welland, Ont., the cost to be \$45,000. In the early future contracts will be let by the Welland Town Council for the pump house and equipment.

The Canadian Carbide Company has been incorporated under Dominion letters patent with a capital stock of \$2,000,000, the head office to be in Montreal.

The plans for the dry dock which the J. B. Polson Iron Works is to build in connection with its plant in Toronto have been approved by the Public Works Department at Ottawa.

The Pearl Lake Gold Mining Company at Porcupine City, Ont., is about to install two sampling stamps and a 20-drill compressor. Electrical machinery will also be installed.

It is stated that a large merger of manufacturing concerns, among which the Perrin Plow & Stove Company, Smith's Falls, Ont., is mentioned, is projected.

The Gillette Safety Razor Company will increase the capacity of its Montreal works by the construction of a factory to cost from \$150,000 to \$200,000. The architects are Lockwood & Green, Boston.

The Isle au Heron Development Company has been formed to develop power on the Lachine rapids, Montreal.

The Marsh Standard Cable Company, Pittsburgh, has decided upon Hamilton, Ont., as the point at which to establish its Canadian plant, to cost \$500,000. A site has been chosen. Other American companies that have arranged to establish branch works in Hamilton are the Boston Insulated Wire & Cable Company, Dorchester, Mass.; Taylor Mfg. Company, Princeton, Ind., to make store fittings, etc., and Mayor Brown Company, to manufacture brass and stencil goods.

The changes which the new owners propose to make in the plant of the Canadian Locomotive Company at Kingston, Ont., will double its capacity.

It is estimated that the work in St. John harbor, N. B., for which tenders are being called by the Public Works Department at Ottawa, will cost from \$8,000,000 to \$10,000,000. They include a dry dock and ship repairing plant, the dredging of Courtenay Bay, the construction of three steamship berths and a breakwater.

The Leggett & Platt Spring Bed & Mfg. Company, Carthage, Mo., will establish a branch factory at Wind-

THE MACHINERY MARKETS

sor, Ont. This will be the fifth branch located at various points in the United States and Canada. The company is not contemplating consolidating its various works at Windsor as was erroneously stated in *The Iron Age* of June 15.

Western Canada

WINNIPEG, MAN., June 23, 1911.

The locomotive and car shops now under construction about six miles from Winnipeg on the line of the National Transcontinental Railway are intended to look after the general repairs for 1800 miles of operating line. There are to be 25 buildings with an aggregate floor space of 17 acres. Each building is so constructed as to have leeway for its extension to double its present size. The electric traveling cranes throughout the plant are equipped with alternating current motors and are operated directly by the three-phase current from the power-house.

President Butterworth of the John Deere Plow Company, Moline, Ill., one of a party of eight who have just completed a tour of the Canadian West, is reported to have made this statement at Winnipeg: "At Calgary the directors have decided to erect an additional warehouse which will be more commodious than the present premises there, to cost \$100,000. To further emphasize their impression of the remarkable growth in and around Edmonton, where the company has a large trackage warehouse, situated on railroad property, land has been acquired where it will erect a building at a cost of \$100,000, and Regina is also to be favored. Here the company already has a fine warehouse of its own immediately adjoining the railroad, but in order to cope with the ever-increasing business a new site 125 x 500 ft. has been purchased. The whole of this space is to be utilized for the erection of another building which should surpass all other efforts, at an estimated cost of \$150,000. Only last year the company erected at Saskatchewan a five-story warehouse at a cost of \$125,000 and a similar building at Lethbridge, which cost \$50,000. This is one of the benefits of reciprocity."

R. B. McArthur, who is arranging to establish a watch factory at Port Arthur, Ont., says the works will be of a capacity adequate to supply both Eastern and Western Canada.

The plant of the Port Arthur Wagon Works, Port Arthur, Ont., is under construction. A meeting of the directors was held a few days ago to consider further operations.

Moose Jaw, Sask., is making very remarkable progress. A notable feature in its development is the multiplication of warehouses located there by Eastern Canada manufacturers.

Construction of a new sawmill to replace the one destroyed at Pitt River, Coquitlam, British Columbia, several months ago, is being started by the Pitt River Lumber Company. J. C. Shields, the president, stated that the mill will be built of concrete and steel in order to make it absolutely fireproof. The plant will cost between \$125,000 and \$150,000.

Specifications will soon be prepared by A. J. Latornell, city engineer, Edmonton, Alberta, for two 6,000,000 gal. pumps required there for waterworks extensions; one pump 400-ft. head, steam turbine drive; one 80-ft. high-speed engine drive.

A by-law is to be submitted to the town of MacLeod, Alberta, to raise \$46,000 for waterworks and lighting system extension. The town clerk is E. F. Brown.

The people of the town of Olds, Alberta, are contemplating the construction of waterworks, at a cost of about \$30,000.

The installation of a street railway system in Lethbridge, Alberta, necessitates additional power-house equipment. There will be required four boilers, extension to present economizer and coal conveyor, electrical unit and steam-driven exciter, a motor generator and switching apparatus.

The town of Wetaskiwin, Alberta, requires for its power plant a gas engine driven generator and an air compressor, motor driven.

The town of Watrous, Sask., has completed arrangements with the Brydges Engine & Supply Company for the installing of an 82-hp. gas engine, a 90-hp. suction gas producer and a 50-kw. generator for supplying electric light to the town.

A bylaw has been passed by the city of Saskatoon, Sask., for an extension of the electric light system, to the extent of \$25,000.

In the electric light department of Moose Jaw, Sask., there will be expenditures this year of \$50,000 for improvement and extensions.

The town of Wainwright, Alberta, will instal an electric light plant.

At a meeting of the Town Council of Lacombe, Alberta, held recently, it was decided that the construction of the water works system for fire protection should commence at once.

Government Purchases

WASHINGTON, D. C., June 26, 1911.

The United States Reclamation Service, Fallon, Nev., will open bids July 5 for one 36-in. belt conveyor 925 ft. long, gravel screen and all accessories complete.

The Department of the Interior, Washington, D. C., will open bids July 3 for furnishing and installing coal and ash handling machinery in the old Postoffice building, Washington.

The office of the treasurer Southern branch of the National Soldiers' Home, Virginia, will open bids July 14 for furnishing and installing electric driven sewerage pumps in buildings Nos. 19 and 60.

The supervising architect, Treasury Department, Washington, D. C., opened bids June 16 for installing two new engines and generators in the Postoffice, Baltimore, Md., as follows: Ridgeway Dynamo & Engine Company, Ridgeway, Pa., \$9150; Harrisburg Foundry & Machine Works, Harrisburg, Pa., \$8250; Crook-Kries & Co., Baltimore, Md., \$8775; T. C. Bashor Company, Baltimore, Md., \$8000.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids June 20 for material and supplies for the navy yards as follows:

Class 1, one Watson-Stillman hydraulic forcing press—Bidder 45, Camden Iron Works, Camden, N. J., \$860; 99, Grisco-Spencer Company, New York, \$816; 149, Edgar M. Moore, Pittsburgh, Pa., \$910.96; 151, Manning, Maxwell & Moore, New York, \$849; 176, Niles-Bement-Pond Company, \$1035; 262, Watson-Stillman Company, \$850; 298, Eccles & Smith, San Francisco, Cal., \$995.

Class 11, three transformers—Bidder 5, American Transformer Company, Newark, N. J., \$350; 48, Crocker-Wheeler Company, Ampere, N. J., \$300; 97, General Electric Company, Schenectady, N. Y., \$319; 153, Maloney Electric Company, St. Louis, Mo., \$285; 179, National Electrical Supply Company, Washington, D. C., \$337; 259, Westinghouse Electric & Mfg. Company, Washington, D. C., \$360 and \$342.78; 261, Wagner Electric Mfg. Company, St. Louis, Mo., \$338.60.

Class 62, eight motor driven back geared acrow cutting engine lathes—Bidder 86, Fairbanks Company, Washington, D. C., \$1136; 88, Frevert Machinery Company, New York, \$948.75; 99, Grisco-Spencer Company, New York, \$845.30; 102, Garvin Machine Company, New York, \$952.25; 131, J. P. Kemp, Baltimore, Md., \$924.50 and \$890; 151, Manning, Maxwell & Moore, New York, \$892, \$1057.50, \$835 and \$1163; 176, Niles-Bement-Pond Company, New York, \$1045; 205, Prentiss Tool & Supply Company, New York, \$895.

Class 63, one extension boring and turning mill—Bidder 151, Manning, Maxwell & Moore, \$9995; 176, Niles-Bement-Pond Company, New York, \$9775; 205, Prentiss Tool & Supply Company, New York, \$9877 and \$9815; 221, William Sellers & Co., Philadelphia, Pa., \$11,735 and \$12,700.

Class 71, for furnishing and erecting one locomotive crane—Bidder 12, American Hoist & Derrick Company, St. Paul, Minn., \$2762; 17, Browning Engineering Company, Cleveland, Ohio, \$6350; 162, McMyler Interstate Company, Bedford, Ohio, \$5135; 186, Orton & Steinbrunner, Chicago, Ill., \$5375; 187, Ohio Locomotive & Crane Company, Bucyrus, Ohio, \$3750.

Class 72, one universal saw bench—Bidder 6, American Woodworking Machinery Company, Rochester, N. Y., \$375; 86, Fairbanks Company, Washington, D. C., \$200; 90, J. A. Fay & Egan Company, Cincinnati, Ohio, \$337.50 and \$202.50 and \$216; 99, Grisco-Spencer Company, New York, \$415; 131, J. P. Kemp, Baltimore, Md., \$305.70; 151, Manning, Maxwell & Moore, New York, \$313 and \$390; 176, Niles-Bement-Pond Company, New York, \$335; 191, Oliver Machinery Company, New York, \$393 and \$315; 205, Prentiss Tool & Supply Company, New York, \$325; 213, H. W. Root Company, York, Pa., \$123.30.

Class 73, one universal trimmer, one sensitive drill, one scroll saw and one band saw—Bidder 6, American Woodworking Machinery Company, Rochester, N. Y., \$195; 71, Dwight Slate Machine Company, Hartford, Conn., \$153; 86, Fairbanks Company, Washington, D. C., \$271; 90, J. A. Fay & Egan Company, Cincinnati, Ohio, \$191.20; 131, J. P. Kemp, Baltimore, Md., \$227; 151, Manning, Maxwell & Moore, New York, \$235; 191, Oliver Machinery Company, New York, \$169.

The T. F. Almond Mfg. Company, Ashburnham, Mass., is putting on the market a new flexible casing for the protection of speedometer shafting. A prime purpose of the design is to obtain the greatest possible measure of flexibility. Two coils of wire are used, snugly locked together. The inner wire is a tempered steel spring with a flat surface turned to the inside, which construction forms a small smooth bore as a tube supporting the flexible shaft. The outer coil forms the oil tight casing and consists of a continuous length of special shaped brass wire.

CURRENT METAL PRICES.

The following quotations are for small lots, New York. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—		Genuine Iron Sheets—		METALS—	
Bar Iron from Store—		Galvanized		Tin—	
Refined Iron:		Nos. 22 and 24.....		Straits Pig.....	
1 to 1 1/2 in. round and square.....		No. 26.....		Copper—	
1 1/2 to 4 in. x 1/2 to 1 in.....		No. 28.....		Lake Ingot.....	
1 1/2 to 4 in. x 1/2 to 5-1.....		Corrugated Roofing—		Electrolytic.....	
Rods—1/2 and 11-16 round and square.....		2 1/2 in. corrugated.....		Casting.....	
Angles:		No. 24.....		Spelter—	
3 in. x 1/2 in. and larger.....		No. 26.....		Western.....	
3 in. x 3-16 in. and 1/2 in.....		No. 28.....		Zinc—	
1 1/2 to 2 1/2 in. x 1/2 in.....		Tin Plates—		No. 9, base, casks.....	
1 1/2 to 2 1/2 in. x 3-16 in. and thicker.....		American Charcoal Plates (per box)		Lead—	
1 to 1 1/2 x 1/2 in.....		"A.A.A." Charcoal:		American Pig.....	
1 to 1 1/2 x 1/2 in.....		IC, 14 x 20.....		Bar.....	
1 to 1 1/2 x 1/2 in.....		IX, 14 x 20.....		Solder—	
1 to 1 1/2 x 1/2 in.....		A. Charcoal:		1/2 & 1/2, guaranteed.....	
1 to 1 1/2 x 1/2 in.....		IC, 14 x 20.....		No. 1.....	
1 to 1 1/2 x 1/2 in.....		IX, 14 x 20.....		Refined.....	
1 to 1 1/2 x 1/2 in.....		American Coke Plates—Bessemer—		Prices of Solder indicated by private brand vary according to composition.	
1 to 1 1/2 x 1/2 in.....		IC, 14 x 20.....		Antimony—	
1 to 1 1/2 x 1/2 in.....		IX, 14 x 20.....		Cookson.....	
1 to 1 1/2 x 1/2 in.....		American Terne Plates—		Halletts.....	
1 to 1 1/2 x 1/2 in.....		IC, 20 x 28 with an 8 lb. coating.....		Other Brands.....	
1 to 1 1/2 x 1/2 in.....		IX, 20 x 28 with an 8 lb. coating.....		Bismuth—	
1 to 1 1/2 x 1/2 in.....		Seamless Brass Tubes—		Per lb.....	
1 to 1 1/2 x 1/2 in.....		List November 13, 1908.....		Aluminum—	
1 to 1 1/2 x 1/2 in.....		Brass Tubes, Iron Pipe Sizes—		No. 1 Aluminum (guaranteed over 99% pure)	
1 to 1 1/2 x 1/2 in.....		List November 13, 1908.....		Ingots for remelting.....	
1 to 1 1/2 x 1/2 in.....		Copper Tubes—		Rods & Wire.....	
1 to 1 1/2 x 1/2 in.....		List November 13, 1908.....		Sheets.....	
1 to 1 1/2 x 1/2 in.....		Brazed Brass Tubes—		Old Metals—	
1 to 1 1/2 x 1/2 in.....		List February 1, 1911.....		Dealers' Purchasing Prices Paid in New Y.	
1 to 1 1/2 x 1/2 in.....		High Brass Rods—		Copper, heavy and crucible.....	
1 to 1 1/2 x 1/2 in.....		List February 1, 1911.....		Copper, heavy and wire.....	
1 to 1 1/2 x 1/2 in.....		Roll and Sheet Brass—		Copper, light and bottoms.....	
1 to 1 1/2 x 1/2 in.....		List February 1, 1911.....		Brass, heavy.....	
1 to 1 1/2 x 1/2 in.....		Brass Wire—		Brass, light.....	
1 to 1 1/2 x 1/2 in.....		List February 1, 1911.....		Heavy machine composition.....	
1 to 1 1/2 x 1/2 in.....		Copper Wire—		Clean brass turnings.....	
1 to 1 1/2 x 1/2 in.....		Base Price, Carload lots mill 13 1/2%		Composition turnings.....	
1 to 1 1/2 x 1/2 in.....		Copper Sheets—		Lead, heavy.....	
1 to 1 1/2 x 1/2 in.....		Sheet Copper Hot Rolled, 16 oz. (quantity lots).....		Lead, ten.....	
1 to 1 1/2 x 1/2 in.....		Sheet Copper Cold Rolled, 16 lb advance over Hot Rolled.....		Zinc, scrap.....	
1 to 1 1/2 x 1/2 in.....		Sheet Copper Polished 20 in. wide and under, 16 lb square foot.....			
1 to 1 1/2 x 1/2 in.....		Sheet Copper Polished over 20 in. wide, 26 lb square foot.....			
1 to 1 1/2 x 1/2 in.....		Polished Copper, 16 lb square foot more than Polished.....			

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